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Surgery for trigger finger (Review)

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[Intervention Review]

Surgery for trigger finger

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ABSTRACT

Background

Trigger finger is a common clinical disorder, characterised by pain and catching as the patient flexes and extends digits because of disproportion between the diameter of flexor tendons and the A1 pulley. The treatment approach may include non-surgical or surgical treatments. Currently there is no consensus about the best surgical treatment approach (open, percutaneous or endoscopic approaches).

Objectives

To evaluate the effectiveness and safety of different methods of surgical treatment for trigger finger (open, percutaneous or endoscopic approaches) in adults at any stage of the disease.

Search methods

We searched CENTRAL, MEDLINE, Embase and LILACS up to August 2017.

Selection criteria

We included randomised or quasi-randomised controlled trials that assessed adults with trigger finger and compared any type of surgical treatment with each other or with any other non-surgical intervention. The major outcomes were the resolution of trigger finger, pain, hand function, participant-reported treatment success or satisfaction, recurrence of triggering, adverse events and neurovascular injury.

Data collection and analysis

Two review authors independently selected the trial reports, extracted the data and assessed the risk of bias. Measures of treatment effect for dichotomous outcomes calculated risk ratios (RRs), and mean differences (MDs) or standardised mean differences (SMD) for continuous outcomes, with 95% confidence intervals (CIs). When possible, the data were pooled into meta-analysis using the random-effects model. GRADE was used to assess the quality of evidence for each outcome.

Main results

Fourteen trials were included, totalling 1260 participants, with 1361 trigger fingers. The age of participants included in the studies ranged from 16 to 88 years; and the majority of participants were women (approximately 70%). The average duration of symptoms ranged from three to 15 months, and the follow-up after the procedure ranged from eight weeks to 23 months.

The studies reported nine types of comparisons: open surgery versus steroid injections (two studies); percutaneous surgery versus steroid injection (five studies); open surgery versus steroid injection plus ultrasound-guided hyaluronic acid injection (one study); percutaneous

surgery plus steroid injection versus steroid injection (one study); percutaneous surgery versus open surgery (five studies); endoscopic surgery versus open surgery (one study); and three comparisons of types of incision for open surgery (transverse incision of the skin in the distal palmar crease, transverse incision of the skin about 2-3 mm distally from distal palmar crease, and longitudinal incision of the skin) (one study).

Most studies had significant methodological flaws and were considered at high or unclear risk of selection bias, performance bias, detection bias and reporting bias. The primary comparison was open surgery versus steroid injections, because open surgery is the oldest and the most widely used treatment method and considered as standard surgery, whereas steroid injection is the least invasive control treatment method as reported in the studies in this review and is often used as first-line treatment in clinical practice.

Compared with steroid injection, there was low-quality evidence that open surgery provides benefits with respect to less triggering recurrence, although it has the disadvantage of being more painful. Evidence was downgraded due to study design flaws and imprecision.

Based on two trials (270 participants) from six up to 12 months, 50/130 (or 385 per 1000) individuals had recurrence of trigger finger in the steroid injection group compared with 8/140 (or 65 per 1000; range 35 to 127) in the open surgery group, RR 0.17 (95% CI 0.09 to 0.33), for an absolute risk difference that 29% fewer people had recurrence of symptoms with open surgery (60% fewer to 3% more individuals); relative change translates to improvement of 83% in the open surgery group (67% to 91% better).

At one week, 9/49 (184 per 1000) people had pain on the palm of the hand in the steroid injection group compared with 38/56 (or 678 per 1000; ranging from 366 to 1000) in the open surgery group, RR 3.69 (95% CI 1.99 to 6.85), for an absolute risk difference that 49% more had pain with open surgery (33% to 66% more); relative change translates to worsening of 269% (585% to 99% worse) (one trial, 105 participants).

Because of very low quality evidence from two trials we are uncertain whether open surgery improve resolution of trigger finger in the follow-up at six to 12 months, when compared with steroid injection (131/140 observed in the open surgery group compared with 80/130 in the control group; RR 1.48, 95% CI 0.79 to 2.76); evidence was downgraded due to study design flaws, inconsistency and imprecision. Low-quality evidence from two trials and few event rates (270 participants) from six up to 12 months of follow-up, we are uncertain whether open surgery increased the risk of adverse events (incidence of infection, tendon injury, flare, cutaneous discomfort and fat necrosis) (18/140 observed in the open surgery group compared with 17/130 in the control group; RR 1.02, 95% CI 0.57 to 1.84) and neurovascular injury (9/140 observed in the open surgery group compared with 4/130 in the control group; RR 2.17, 95% CI 0.7 to 6.77). Twelve participants (8 versus 4) did not complete the follow-up, and it was considered that they did not have a positive outcome in the data analysis. We are uncertain whether open surgery was more effective than steroid injection in improving hand function or participant satisfaction as studies did not report these outcomes.

Authors' conclusions

Low-quality evidence indicates that, compared with steroid injection, open surgical treatment in people with trigger finger, may result in a less recurrence rate from six up to 12 months following the treatment, although it increases the incidence of pain during the first follow-up week. We are uncertain about the effect of open surgery with regard to the resolution rate in follow-up at six to 12 months, compared with steroid injections, due high heterogeneity and few events occurred in the trials; we are uncertain too about the risk of adverse events and neurovascular injury because of a few events occurred in the studies. Hand function or participant satisfaction were not reported.

PLAIN LANGUAGE SUMMARY

Surgery for trigger finger

Background

Trigger finger is clinically characterised by pain and catching during finger movements. Classically, the initial treatment is non-surgical using nonsteroidal anti-inflammatory drugs, splinting and corticosteroid injection, and may require surgical treatment if the conventional treatment fails. Although it is a common condition, there is no consensus about the best surgical treatment approach (by skin incision and direct vision of the hand structures (open); approaches via needle or blade introduced through the skin, with no direct vision of the hand structures (percutaneous); or via a flexible tube with a light camera attached to it (endoscopic).

Study characteristics

This Cochrane Review is current to August 2017. We included 14 randomised controlled trials involving 1260 participants, totalling 1361 trigger fingers. Two studies compared open surgery versus steroid injections, five studies compared percutaneous surgery versus steroid injection, one study compared open surgery versus steroid injection plus hyaluronic acid injection, one study compared percutaneous surgery plus steroid injection versus steroid injection, five studies compared percutaneous surgery versus open surgery, one study compared endoscopic surgery versus open surgery and one study compared three types of skin incision to open surgery. The majority of participants were female (about 70%); they were aged between 16 and 88 years; and the mean follow-up of participants after the procedure was eight weeks to 23 months. Due to space constraints, the reporting of all results was limited to the main comparison - open surgery versus steroid injection - because open surgery is the oldest and the most widely used treatment method and considered as standard surgery, whereas steroid injection is the least invasive control treatment method as reported in the studies in this review and is often used as first-line treatment in clinical practice.

Key results

Based on two trial (270 participants), compared with the steroid injection procedure:

Resolution of trigger finger (lessening of symptoms with no recurrence):

• 92 out of 100 people had resolution of symptoms with open surgery.

• 61 out of 100 people had resolution of symptoms with steroid injection.

Incidence of pain, assessed as the presence or absence of pain after the procedure was performed (at one week):

• 49% more people had pain with open surgery (33% to 66% more).

• 68 out of 100 people had pain with open surgery.

• 19 out of 100 people had pain with steroid injection.

Recurrence of the trigger finger (from six to 12 months):

• 29% fewer people had recurrence of symptoms with open surgery (60% fewer to 3% more).

• 7 out of 100 people had recurrence of symptoms with open surgery.

• 39 out of 100 people had recurrence of symptoms with steroid injection.

Adverse events:

Adverse events including infections, tendon injuries, cutaneous discomfort, flare or fat necrosis at the procedure site, or neovascular events were uncommon in either treatment group.

No study reported hand function or participant-reported treatment success or satisfaction.

Quality of the evidence

Very low quality evidence from two trials means we are uncertain whether open surgery improve resolution of trigger finger in comparison with steroid injection, due the risk of bias in the design of the studies, inconsistencies between studies and the small number of participants in studies. Low-quality evidence from two trials shows that open surgery may result in fewer recurrences of trigger finger compared with steroid injection procedure, although it increases the incidence of pain during the first week after the procedure. Evidence was downgraded to 'low' due to the risk of bias in the design and the small number of participants. No studies measured functional improvement or participant satisfaction in the comparison between open surgery and steroid injection. We are uncertain whether there is a difference in the risk of adverse events or neurovascular injury between treatments, as few events occurred in the studies.

Only low and very low-quality evidence was found for other comparisons so we are uncertain if percutaneous surgery has any benefits over steroid injection, or if open surgery is better than steroid plus hyaluronic acid, or if one type of surgery is better than another.

SUMMARY OF FINDINGS FOR THE MAIN COMPARISON [*Explanation*]

Open surgery versus steroid injection for treating trigger finger

Patient or population: patients with trigger finger
Settings: hospital
Intervention: open surgery
Comparison: steroid injection

Outcomes	Illustrative comparative risks* (95% CI)		Relative effect (95% CI)	No of Participants (studies)	Quality of the evidence (GRADE)	Comments
	Assumed risk	Corresponding risk				
	Steroid injection	Open surgery				
Resolution of symptoms (after one or more injections) Follow-up: 6 to 12 months	615 per 1000	911 per 1000 (486 to 1000)	RR 1.48 (0.79 to 2.76)	270 (2 RCTs)	⊕◯◯◯ VERY LOW [1,2,3]	Absolute difference: 28% more had resolution of symptoms with open surgery (2% fewer to 58% more); relative change: 48% more (21% fewer to 176% more). The NNTH n/a[4].
Pain Proportion with pain on the palm of the hand Follow-up: 1 week	184 per 1000	678 per 1000 (366 to 1000)	RR 3.69 (1.99 to 6.85)	105 (1 RCT)	⊕⊕◯◯ LOW [1,3]	Absolute risk difference: 49% more people had pain with surgery (33% to 66% more), and the relative percent change translates to worsening of 269% (585% to 99% worse). The NNTH was 3 (95% CI 1 to 5)
Function Not measured	See comment	See comment	See comment	-	See comment	Not measured in any trial.

Participant global assessment of success Not measured	See comment	See comment	See comment	-	See comment	Not measured in any trial.
Recurrence Follow-up: range 6 to 12 months	385 per 1000	65 per 1000 (35 to 127)	RR 0.17 (0.09 to 0.33)	270 (2 RCTs)	⊕⊕◯◯ LOW [1,3]	Absolute risk difference: 29% fewer people had recurrence with open surgery (60% fewer to 3% more), and the relative percent change translates to improvement of 83% (67% to 91% better). NNTB 4 (95% CI 3 to 4)
Adverse events (infection, tendon or pulley injury, flare, cutaneous discomfort, fat necrosis) Follow-up: range 6 to 12 months	131 per 1000	133 per 1000 (75 to 241)	RR 1.02 (0.57 to 1.84)	270 (2 RCTs)	⊕⊕◯◯ LOW [1,3]	Absolute risk difference: 0% (3% fewer to 4% more), and the relative percent change translates to worsening of 2% (43% better to 84% worse). The NNTH n/a[4].
Neurovascular injury Follow-up: range 6 to 12 months	31 per 1000	67 per 1000 (22 to 208)	RR 2.17 (0.7 to 6.77)	270 (2 RCTs)	⊕⊕◯◯ LOW [1,3]	Absolute risk difference: 2% more people had neurovascular injury with open surgery (6% fewer to 11% more) ; relative change: 117% more (30% fewer to 577% more). The NNTB n/a[4].

*The basis for the **assumed risk** (e.g. the median control group risk across studies) is provided in footnotes. The **corresponding risk** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).
CI: Confidence interval;

GRADE Working Group grades of evidence
High quality: Further research is very unlikely to change our confidence in the estimate of effect.
Moderate quality: Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate.
Low quality: Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.
Very low quality: We are very uncertain about the estimate.

[1]The trials had methodological flaws: risk of detection bias.
[2]Inconsistency: heterogeneity was high.
[3]Imprecision: the total number of events was small, or the 95% confidence interval includes both open surgery and steroid injection groups, or the 95% confidence interval includes both no clinical effect, and "appreciable benefit" in favour of the open surgery group.
[4]Number needed to treat to benefit (NNTB), or harm (NNTH) not applicable (n/a) when result is not statistically significant. NNT for dichotomous outcomes calculated using Cates NNT calculator (http://www.nntonline.net/visualrx/). NNT for continuous outcomes calculated using Wells Calculator (CMSG editorial office).

BACKGROUND

Flexor tendons of the hands slide inside osteofibrous tunnels (pulleys) (Akhtar 2005; Doyle 1975; Doyle 1977; Doyle 1988; Doyle 1989; Jones 1988). Trigger finger is a common clinical disorder, characterised by catching or snapping as the patient flexes and extends digits because of a disproportion between the diameter of flexor tendons and the A1 pulley (Akhtar 2005; Eastwood 1992; Sato 2012; Wolfe 2005). The gliding of the flexor tendons can cause adaptive changes that lead to stenosis of the A1 pulley (Sampson 1991). The friction caused in the flexor tendons when passing through the stenotic pulley can change the fibres, forming an intratendinous lump (Hueston 1972). The clinical manifestation may vary from an occasional snapping to finger locked in flexion (Akhtar 2005; Peters-Veluthamaningal 2009; Quinnell 1980), although sometimes locking in extension, hence an inability to achieve flexion of the affected finger, can also occur (Hueston 1972). The presence of pain is common, ranging from severe to mild discomfort, often in the palm, on the metacarpophalangeal (MCP) joint or on the proximal interphalangeal (PIP) joint (Eastwood 1992; Ryzewicz 2006).

Description of the condition

Trigger finger has an incidence of about 2.6% in the general population (Strom 1977). It is one of the most common causes of pain and disability in the hand (Akhtar 2005; Wolfe 2005). It is four to six times more frequent in women, and can occur at any age, but it more often affects the dominant hand of people in their fifties (Fleisch 2007; Sato 2012; Weilby 1970). The most affected digits are the thumb, ring and middle finger; the index finger is almost always the least involved (Blyth 1996; Ragoowansi 2005; Weilby 1970). It is not uncommon for a person to have multiple trigger digits (Ryzewicz 2006; Sheikh 2014). Notta 1850 first described this disease many years ago. Although histological changes of A1 pulley and synovial proliferation have been identified as factors that prompt trigger finger, the exact aetiology is still unknown (Quinnell 1980; Sampson 1991; Sato 2012). Some diseases are associated with trigger finger, such as gout, carpal tunnel syndrome, De Quervain's disease, diabetes, amyloidosis and mucopolysaccharidosis, as a consequence of connective tissue metabolism changes (Akhtar 2005; Ryzewicz 2006; Turowski 1997); in the population of diabetic patients, for example, the incidence of trigger digits reaches 10% (Stahl 1997). The patient may start feeling pain on the palm or in the proximal interphalangeal joint without triggering of the digit; these symptoms may disappear or increase in severity, leading to pain and hand dysfunction and they can result in stiffness of the affected fingers' PIP joint (Ryzewicz 2006). Quinnell 1980 classified trigger finger into five types: type zero (0), with normal motion; type I, uneven movement; type II, trigger finger that is actively corrected; type III, trigger finger that needs an external force for unlocking; and type IV, with a fixed deformity.

Description of the intervention

The initial treatment for trigger finger is conservative and involves activity modification, non-steroidal anti-inflammatory drugs, splinting (Patel 1992), and corticosteroid injection (Kazuki 2006; Murphy 1995; Ring 2008). A Cochrane Review summarised the efficacy of corticosteroid injections for trigger finger in adults. Corticosteroid injection with lidocaine was more effective than lidocaine alone; however, only two small studies were included on this review. The risk of adverse events was uncertain (Peters-Veluthamaningal 2009).

However, some studies reported recurrence rate up to 48% after corticosteroid treatment (Kazuki 2006; Rhoades 1984; Ring 2008). For any stage of the disease, the initial treatment is conservative; however, if tendinous obstruction symptoms are not satisfactorily relieved through conservative treatments, the A1 pulley is sharply incised longitudinally, through an open (Fahey 1954; Paul 1992), percutaneous (Bain 1995; Cebesoy 2007; Eastwood 1992; Gilberts 2001; Lorthioir 1952; Pope 1995), or endoscopic (Pegoli 2008) surgical approach. Surgical treatment for trigger finger has a reported success rate of up to 97% (Gilberts 2001; Pegoli 2008; Turowski 1997).

The open surgical method involves skin incision, dissection of the neurovascular bundles, and identification and incision of the A1 pulley under direct vision, which arguably minimises the injury risk to other structures (Akhtar 2005; Fahey 1954; Turowski 1997).

Lorthioir 1952 first described the percutaneous method using a small tenotome. Eastwood 1992 used a needle in the procedure. Nowadays the technique consists of cutting the A1 pulley by a percutaneous insertion of a small instrument (e.g. needle or hook knife) under local anaesthesia (Gulabi 2014; Guler 2013; Rojo-Manaute 2012a). Some argue that this approach may increase the risk of damaging the neurovascular bundle, flexor tendon and capsule, but the approach is gaining acceptance due to the convenience of surgically treating trigger finger with no incision (Cebesoy 2007; Gilberts 2001 Gulabi 2014; Huang 2015).

Endoscopic release consists of two small incisions through which a type of fibre-optic endoscope (camera) passes (Pegoli 2008). The pulley is identified and is opened by a small lamina adapted to the endoscope (Pegoli 2008). This procedure is the least common due to its costs and greater learning curve (Pegoli 2008).

How the intervention might work

The pulleys are fibrous tissue bands that maintain the flexor tendons in a constant connection to the joint axis of motion; the A1 pulley begins on the volar plate of the MCP joint, from which

about two-thirds of its fibres emerge, while its remaining portion is attached to the base of the proximal phalanx (Doyle 1988). People with trigger finger exhibit a pulley stenosis A1 and changes in the fibres of the flexor tendons, with the formation of an intratendinous node and consequent rebound or blocking of the movement of the affected finger (Hueston 1972), and the surgical treatment consists of sectioning the pulley A1 while preserving the flexor tendons to restore the coordinated movement of the finger (Akhtar 2005; Paul 1992). Surgical treatment can be performed through open, percutaneous or endoscopic surgery. Studies of open surgery have reported that the method has the advantage of directly visualizing the structures, allowing a complete section of the A1 pulley with minimum risk of injury to the flexors, tendon and neurovascular bundles (Paul 1992; Turowski 1997), although complications such as surgical site infection and hypertrophic scar or pain have been reported as potential disadvantages (Thorpe 1988). The advantages described for percutaneous surgery are the option to perform a surgical procedure without incising the skin, early return to activities (3.9 days on average) and quick implementation of the technique (seven minutes on average), but disadvantages such as risk of neurovascular injury, or injury to flexor tendons or the joint capsule have been reported, because these structures could not be visualized (Cebesoy 2007; Gilberts 2001; Huang 2015). Some studies, however, have described cutaneous parameters of the palmar surface that serve as reference to locate the A1 pulley (Fiorini 2011; Wilhelmi 2001). In endoscopic surgery the pulley A1 section is performed under indirect visualization with a camera introduced through the skin, and the absence of scar contraction, early return to activities and quick execution of the procedure (4½ minutes on average) were reported as the main advantages of the technique; on the other hand, the high cost and long learning curve were reported as disadvantages (Pegoli 2008).

Why it is important to do this review

Trigger digit is one of the most common forms of tenosynovitis, and affects mostly middle-aged women's hands (Sato 2012; Weilby 1970). It can lead to long-term pain, deformity and disability (Akhtar 2005; Eastwood 1992). Despite its high frequency, there is no consensus about the best surgical approach to treat it.

This review summarises the available evidence in the literature of surgical interventions, considering safety and benefits of treatment as measured by resolution of the condition, pain, hand function, patient satisfaction, frequency of recurrence of triggering, adverse events and neurovascular injury.

OBJECTIVES

To evaluate the effectiveness and safety of different methods of surgical treatment for trigger finger (open, percutaneous or endoscopic approaches) in adults at any stage of the disease.

METHODS

Criteria for considering studies for this review

Types of studies

We included any randomised or quasi-randomised (not strictly random: e.g. by date of birth, hospital record number, alternation) controlled trials of surgical treatment for trigger finger.

Types of participants

We included all studies involving adults who had been diagnosed with trigger finger. Any trials exclusively including adolescents or children were excluded. Studies that included children were only included if the proportion of children was less than 10%, or data were presented separately for adults.

This review assessed only adults because the physiopathology, treatment timing and techniques are different in children.

Types of interventions

Surgical treatment for trigger finger was considered, including open, percutaneous or endoscopic techniques.

All control interventions were eligible, including non-surgical interventions (use of splinting, physiotherapy and corticosteroids infiltration), placebo, no interventions ('wait and see') and any other therapy (including different surgical interventions).

We included studies with co-interventions, as long as the effect of surgery could be assessed (i.e. we excluded trials that used the same surgery in two treatment arms plus a co-intervention in one arm). Studies that included co-interventions as a comparator were assessed separately from studies with a single comparator (e.g. open surgery versus percutaneous surgery plus steroid injection were assessed separately from trials comparing open surgery and percutaneous surgery).

Types of outcome measures

We considered for inclusion studies that included at least one of the following outcome measures.

Major outcomes

1. Resolution of trigger finger (as defined in the trials).
2. Pain. Severity of pain or tenderness at the base of the digit on the palm of the hand, or incidence of pain as a dichotomous outcome. Preference was given to reports of the severity of pain measured using validated pain scales (visual analogue scale (VAS) or numerical rating scale).
3. Functional status of the hand (using validated instruments to measure hand function, e.g. Disability of the Arm, Shoulder and Hand questionnaire, or DASH).

4. Participant-reported treatment success or satisfaction (either reported as a proportion with success, or using validated questionnaires).

5. Frequency of recurrence of triggering or locking of the affected fingers.

6. Number of patients experiencing any adverse event (e.g. superficial infection, deep infection and adherence).

7. Neurovascular injury.

Timing of outcomes measurement

If there were available data, we extracted outcomes at the following time periods: short-term follow-up (up to three months following treatment); intermediate follow-up (more than three months and up to six months after the end of treatment); and long-term (more than six months after the end of treatment). When multiple time points (e.g. one, six, eight and 12 weeks' follow-up) were reported in the trials, we extracted all available data and reported the results; however in the analysis of the different comparison groups of the studies that reported results in the same period of time, we grouped the data using the time period reported in the publications. When different time periods were reported in studies of the same analysis group, we used the longest time period reported in each study for the outcomes 'resolution', 'hand function', 'patient satisfaction', 'recurrence of trigger finger', 'adverse events' and 'neurovascular injury' for the short-term, intermediate-term and long-term periods. For the pain outcome we used the shortest time period reported in the short-term; however in the intermediate and long term we carried out the analyses using the longest time period reported. To prepare the 'Summary of findings' tables we reported the data using the longest time period assessed in each study for the outcomes 'resolution', 'hand function', 'patient satisfaction', 'recurrence of trigger finger', 'adverse events' and 'neurovascular injury'; while for the outcome 'pain', we reported the shortest time period assessed in the studies, as we believe that the pain assessment in the period closest to the date of the procedure is very important for patients deciding between the various types of treatment, and is different from the other outcomes, in which the longest period of time is the most important factor in the therapeutic decision.

Search methods for identification of studies

Electronic searches

Our search strategy followed Cochrane Musculoskeletal Group (CMSG) methods used in reviews. We searched the Cochrane Central Register of Controlled Trials (CENTRAL; 2017, Issue 7) in the Cochrane Library (searched 16 August 2017), MEDLINE (1946 to 02 August 2017), Embase (1947 to 02 August 2017) and Latin American and Caribbean Health Sciences (LILACS, 1982 to 02 August 2017) (Appendix 1; Appendix 2; Appendix 3; Appendix 4; Appendix 5). We set no restrictions based on language, publication status or publication date.

In MEDLINE (Ovid), the Cochrane Highly Sensitive Search Strategy for identifying randomised trials (sensitivity and precision-maximising version) (Lefebvre 2009) was combined with the subject-specific search (Appendix 2). The MEDLINE strategy was adapted appropriately for the other databases.

We also searched the registries ClinicalTrials.gov (U.S. National Institute of Health) and World Health Organization (WHO) International Clinical Trial Registry Platform for ongoing and recently completed studies (15 September 2017) (Appendix 6; Appendix 7).

Searching other resources

We checked the reference lists of included articles, reviews and textbooks for possible relevant studies.

Data collection and analysis

The intended methodology for data collection and analysis was described in our published protocol (Ventin 2014), which was based on the one explained in the *Cochrane Handbook for Systematic Reviews of Interventions* (Higgins 2011a).

Selection of studies

Two review authors (HFJ and MJT) independently screened title and abstract of studies that met the inclusion criteria for this review. They resolved differences by discussion and consensus and, when necessary, by discussion with the third review author (JCB).

Data extraction and management

Two review authors (HFJ and MJT) used a piloted data extraction form to independently collect data, including the following.

- Study design and duration, funding sources and details of trial registration.
- Place of study, number of participants assigned and assessed, inclusion criteria, exclusion criteria, age, gender, side, affected digits and classification of trigger finger.
- Characteristics of study interventions including timing of intervention, duration of treatment, type of surgery (open, percutaneous or endoscopic) or conservative interventions (steroid only or steroid plus hyaluronic acid injection), rehabilitation and any co-interventions.
- Characteristics of study outcomes such as duration of follow-up, loss to follow-up and outcomes reported in the studies.

We included nine comparisons: open surgery versus steroid injection; percutaneous surgery versus steroid injection; open surgery

versus steroid injection plus hyaluronic acid injection guided by ultrasound; percutaneous surgery plus steroid injection versus steroid injection; percutaneous surgery versus open surgery; endoscopic surgery versus open surgery; open surgery by transversal incision of the skin about 2-3 mm distally from distal palmar crease versus open surgery by longitudinal incision of the skin at the level of the A1-pulley without crossing the distal palmar crease proximal; open surgery by transversal incision of the skin in the distal palmar crease versus open surgery by longitudinal incision of the skin at the level of the A1-pulley without crossing the distal palmar crease proximal; and open surgery by transversal incision of the skin in the distal palmar crease versus open surgery by transversal incision of the skin about 2-3 mm distally from distal palmar crease.

We considered as the primary comparison 'Open surgery versus steroid injection', because open surgery is the oldest and most traditional method of treatment for trigger finger, while steroid injection is the least invasive method reported in the included studies.

A third review author (JCB) resolved all initial differences of opinion. There was no blinding for the study author, institution or journal at this stage.

Two review authors (HFJ and MJT) entered data into Review Manager 5 (RevMan 5) (Review Manager 2014). We sent requests to the primary trial authors of the 14 studies to clarify any omitted data or study characteristics (Aref 2014; Bamroongshawgasame 2010; Callegari 2011; Chao 2009; Dierks 2008; Gilberts 2001; Hansen 2017; Kloeters 2016; Maneerit 2003; Nikolaou 2017; Pegoli 2008; Sato 2012; Singh 2005; Zyluk 2011), but only one author responded to the e-mail (Sato 2012), informing us about the exact number of the thumbs, index, long, ring and little fingers included in each comparison group of the study.

Assessment of risk of bias in included studies

Two independent review authors (HFJ and ML) assessed the risks of bias of the included studies. As recommended by Cochrane's 'Risk of bias' tool (Higgins 2011a), the following methodological domains were assessed.

1. Random sequence generation.
2. Allocation concealment.
3. Blinding of participants and personnel.
4. Blinding of outcome assessment: was considered blinding separately for subjective self-reported outcomes (e.g. resolution of symptoms, pain, function, treatment success or patient satisfaction, recurrence) and objective outcomes (e.g. adverse events, neurovascular injury).
5. Incomplete outcome data.
6. Selective reporting.
7. Other bias, such as major baseline imbalance, risk of bias associated with care providers and differences in rehabilitation.

Each of these criteria was explicitly judged as described by Higgins 2011a into one of these categories: low risk of bias; high risk of bias; and unclear risk of bias (either lack of information or uncertainty over the potential for bias). When necessary, authors recorded and resolved by consensus their disagreements regarding the risk of bias for domains.

Measures of treatment effect

We calculated the risk ratios (RRs) with 95% confidence intervals (CIs) for dichotomous outcomes. We calculated mean differences (MDs) with 95% CIs for continuous outcomes (pain and hand function). We planned to calculate standardised mean differences (SMDs) for continuous outcomes if they were pooled on different scales, but it was not necessary.

We also presented the absolute per cent difference and relative per cent change from baseline for all outcomes in the 'Comments' column of the 'Summary of findings' table. For outcomes that differ statistically between treatment groups, we expressed estimate effects as the number needed to treat for an additional beneficial outcome (NNTB) and the number needed to treat for an additional harmful outcome (NNTH).

For dichotomous outcomes, we calculated the absolute risk difference using the risk difference statistic in RevMan 5 software (Review Manager 2014), and expressed the result as a percentage. For continuous outcomes, we calculated the absolute benefit as the improvement in the intervention group minus the improvement in the control group, in the original units, expressed as a percentage.

We calculated the relative per cent change for dichotomous data as RR − 1 and expressed as a percentage. For continuous outcomes, we calculated the relative difference in the change from baseline as the absolute benefit divided by the baseline mean of the control group, expressed as a percentage.

For dichotomous outcomes, we calculated NNTB or NNTH from the event rate in the control group (unless we knew the population event rate) using the Visual Rx NNT calculator (Cates 2008); we used RR when adverse events were assessed and we used the odds ratio when beneficial events were assessed. For continuous outcomes, NNTB was calculated using the Wells calculator software available at the CMSG editorial office (www.cochranemsk.org). The minimal clinically important difference (MCID) for each outcome was determined for input into the calculator; we assumed that a difference of 1.5 points on a 10-point pain scale between groups is clinically important. For function, we would have assumed a difference of 10 points on the 100-point DASH score is clinically important.

Unit of analysis issues

The unit of randomisation was usually the individual participants. Exceptionally, as in the case of trials including people with more than one finger assessed, we assessed the trial data for fingers, instead of individual participants. We planned to identify studies that randomise or allocate clusters (e.g. many fingers) but do not

account for clustering analysis, and when possible, re-analyse such studies by calculating effective sample sizes according to the methods described in Higgins 2011b, but that was not necessary because none carried out cluster-allocation studies.

Dealing with missing data

We attempted to extract outcomes for all participants randomised to any intervention. In case there was insufficient information relative to estimate effects, such as number of participants, means, measures of uncertainty (standard deviation or error), or number of events and participants, we tried to contact authors of included studies.

For dichotomous outcomes, we used number randomised as denominator, making the assumption that any participants missing at the end of treatment did not have a positive outcome (e.g. for the outcome 'number of patients experiencing any adverse event', we assumed any missing participants had an adverse event).

For continuous outcomes with no standard deviation reported, we planned to calculate standard deviations if possible from standard errors, P values, or confidence intervals, according to the methods outlined in Higgins 2011b; if this was not possible we considered imputing missing standard deviations from other trials of the same meta-analysis.

When impossible to acquire missing data, we addressed the potential impact of missing data on the findings of the review in the Discussion section.

Assessment of heterogeneity

We estimated the presence of heterogeneity across the included studies with visual examination of the forest plot generated from meta-analysis of studies initially considered appropriate for pooling. We assessed the degree of statistical heterogeneity based on the test for heterogeneity and the I^2 statistic. We interpreted the values as follows: 0% to 40% might not be important; 30% to 60% may represent moderate heterogeneity; 50% to 90% may represent substantial heterogeneity; and 75% to 100% shows considerable heterogeneity (Deeks 2011).

Assessment of reporting biases

We planned to draw funnel plots from primary outcomes to assess the potential publication bias (small-study effects), if more than 10 studies were included in the meta-analyses. However, due to the small number of studies included in each comparison it was not possible to perform this type of analysis. We also assessed the presence of bias for small studies in the overall meta-analysis by checking whether the random-effects estimate of the intervention effect is more efficient than the fixed-effect estimate (Sterne 2011).

Data synthesis

For results of comparable groups of studies - with similar participants, the same intervention and comparator, and using the same outcome measure - we pooled outcomes in a meta-analysis using the random-effects model as a default, as we expected some variation in the surgery and comparators.

GRADE and 'Summary of findings' tables

We presented the main results (resolution of trigger finger, severity of pain, functional status of the hand – DASH, participant-reported treatment success, frequency of recurrence of triggering, adverse events and neurovascular injury) of the review in 'Summary of findings' tables in order to improve the readability of the review. The 'Summary of findings' tables provide key information concerning the quality of evidence, the magnitude of effect of the interventions examined (open, percutaneous and endoscopic approach) and the sum of available data on the main outcomes (Schünemann 2011). GRADEpro GDT software was used to provide an overall grading of the quality of the evidence (GRADEpro GDT).

Subgroup analysis and investigation of heterogeneity

Had sufficient data been available, we planned to conduct a subgroup analysis to determine different estimated effects across different age ranges (i.e. younger adults (< 65 years) or older people (65 years and older)); the presence or absence of comorbidities (including carpal tunnel syndrome, diabetes, gout, De Quervain's disease, mucopolysaccharidosis, amyloidosis and rheumatoid arthritis); and at different follow-up times (i.e. short-term (up to three months), intermediate-term (more than three months and up to six months) or long-term follow-up (greater than six months)). Due to lack of data in included studies it was not possible to perform subgroup analysis for age or presence of comorbidities. It was possible to carry out a subgroup analysis by different follow-up times for some comparisons (see Effects of interventions).

Sensitivity analysis

We performed a sensitive analysis to investigate the robustness of the treatment effect to allocation concealment, by removing the trials that reported inadequate or unclear allocation concealment from meta-analysis to see if this changes the overall treatment effect. And we also investigated the effect of imputation of missing data (e.g. imputation of standard deviation).

RESULTS

Description of studies

See: Characteristics of included studies; Characteristics of excluded studies and Characteristics of ongoing studies.

Results of the search

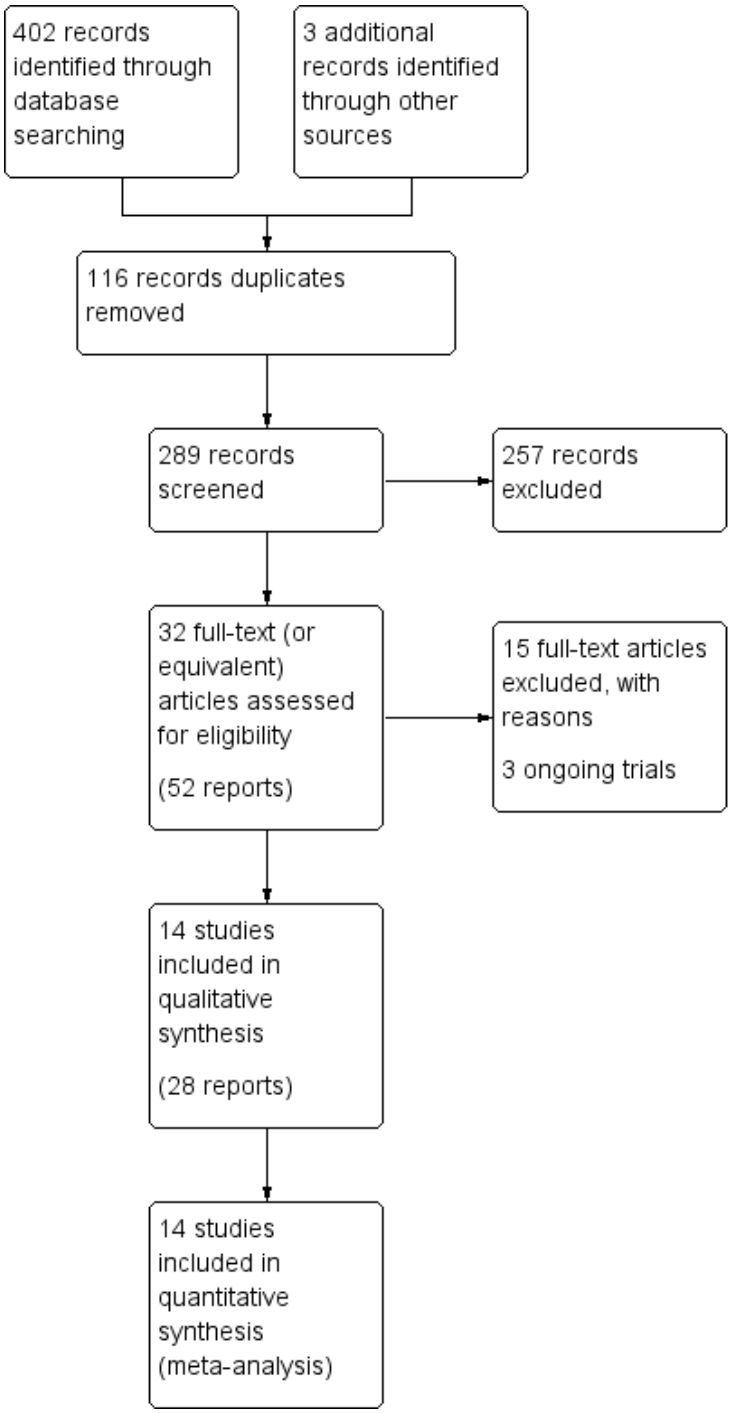
The search strategy was completed in August 2017. We found a total of 402 records from the following databases: Cochrane Musculoskeletal Group Specialised Register (4 records); Cochrane Central Register of Controlled Trials (95); MEDLINE (100); Embase (120); LILACS (24); ClinicalTrials.gov (20); and the WHO International Clinical Trials Registry Platform (39).

We also found three potentially eligible studies from other sources (one from the studies that were included in other published reviews and two by means of automatic search of Google Scholar related to a previous publication on the topic of trigger finger (Fiorini 2011)).

The search result was our identification of 52 bibliographic citations for potentially includable studies, for which we obtained full reports. We finally included 14 studies in this review, from a total of 28 published reports. The included studies were published between 2001 and 2017 (Aref 2014; Bamroongshawgasame 2010; Callegari 2011; Chao 2009; Dierks 2008; Gilberts 2001; Hansen 2017; Kloeters 2016; Maneerit 2003; Nikolaou 2017; Pegoli 2008; Sato 2012; Singh 2005; Zyluk 2011). Only three trials had a published protocol (Hansen 2017; Nikolaou 2017; Sato 2012).

In total there are 14 included studies, 15 excluded studies and three ongoing studies (Figure 1).

Figure 1. Study flow diagram.



Included studies

Characteristics of the 14 included studies can be found in Characteristics of included studies.

Thirteen studies included in the review reported the results in a single publication (Bamroongshawgasame 2010; Callegari 2011; Chao 2009; Dierks 2008; Gilberts 2001; Hansen 2017; Kloeters 2016; Maneerit 2003; Nikolaou 2017; Pegoli 2008; Sato 2012; Singh 2005; Zyluk 2011). One study reported the results in two publications (Aref 2014).

All trials were reported in English.

Design of the studies

Eleven studies were reported as randomised trials - Bamroongshawgasame 2010, Callegari 2011, Chao 2009, Gilberts 2001, Hansen 2017, Kloeters 2016, Maneerit 2003, Nikolaou 2017, Pegoli 2008, Sato 2012 and Zyluk 2011 - and three were quasi-randomised (Aref 2014; Dierks 2008; Singh 2005). In Aref 2014 and Singh 2005 the patients were randomised to either percutaneous surgery or steroid injection using their birth year, and in Dierks 2008 the patients were randomised to either open or percutaneous surgery using their patient numbers. All studies had two intervention groups, except Kloeters 2016 and Sato 2012 which had three intervention groups. All 14 studies were single-centre trials. Aref 2014 took place in Iran; Bamroongshawgasame 2010 and Maneerit 2003 in Thailand; Callegari 2011 and Pegoli 2008 in Italy; Chao 2009 in China; Dierks 2008 in Germany; Gilberts 2001 and Kloeters 2016 in the Netherlands; Hansen 2017 in Denmark; Nikolaou 2017 in Greece; Sato 2012 in Brazil; Singh 2005 in Malaysia; and Zyluk 2011 in Poland.

Sample sizes

The 14 trials enrolled a total of 1260 participants, totalling at least 1361 fingers: a study enrolled 115 participants with a 20 follow-up loss, but the authors did not describe what the totality of fingers involved in the study represented in the loss of these 20 participants (Zyluk 2011). The total follow-up loss in 14 trials was 2.9% (37 participants).

Participants

Age and gender

The age of participants included in the studies ranged from 16 to 88 years. Callegari 2011 assessed participants aged between 35 and 70 years; Dierks 2008 included adults with ages ranging between 18 and 80 years; Gilberts 2001, Hansen 2017, Kloeters 2016 and Nikolaou 2017 included participants aged 18 years or older; Sato 2012 enrolled participants older than 15 years of age; Aref 2014, Chao 2009, Maneerit 2003 and Singh 2005 reported the inclusion of adult participants, but did not specify their age; Bamroongshawgasame 2010, Pegoli 2008 and Zyluk 2011 did not report age as an inclusion criterion, but all participants in these three studies were adults over 18 years of age. Most participants were women (approximately 70%), but the exact number was not calculated because the studies of Gilberts 2001, Maneerit 2003 and Sato 2012 reported gender in relation to the number of fingers, while the others related the number of participants.

Affected digits

Ten studies (Aref 2014; Bamroongshawgasame 2010; Callegari 2011; Chao 2009; Gilberts 2001; Kloeters 2016; Maneerit 2003; Pegoli 2008; Sato 2012; Singh 2005) published data regarding which digits were affected in the assigned participants, totalling 1002 digits, of which 385 (38%) were thumbs, 89 (9%) index, 286 (29%) middle, 205 (20%) ring and 37 (4%) little finger. Zyluk 2011 reported data regarding which digits were affected in the assessed participants, totalling 105 digits, of which 39 (37%) were thumbs, 1 (1%) index, 22 (21%) middle, 35 (33%) ring and 8 (8%) little; Hansen 2017 published the percentage of each affected finger, but was not explicit if the data were referring to the assigned participants (165 digits) or assessed participants (153 digits); Hansen 2017 reported that 39% of the digits were thumbs, 5% index, 25% middle, 25% ring and 6% little.

Dierks 2008 and Nikolaou 2017 assigned a total of 68 participants, but they did not report data on which fingers were affected in these participants.

Types/classification of trigger finger

All trials assessed only participants with trigger finger. Aref 2014, Chao 2009, Hansen 2017, Kloeters 2016, Maneerit 2003, Sato 2012 and Singh 2005 used the classification of Quinnell 1980 to characterise the participants: while Kloeters 2016, Maneerit 2003, Sato 2012 and Singh 2005 used gradation from 0 to IV, Aref 2014, Chao 2009 and Hansen 2017 gradated triggering from I to V, Bamroongshawgasame 2010, Callegari 2011, Nikolaou 2017 and Zyluk 2011 used the classification of Froimson 1993, which corresponds to a change in the classification of Quinnell 1980. Dierks 2008, Gilberts 2001 and Pegoli 2008 did not use any kind of classification.

Timing of intervention

Eleven studies reported data on the timing of intervention (Bamroongshawgasame 2010; Callegari 2011; Chao 2009; Dierks 2008; Gilberts 2001; Hansen 2017; Kloeters 2016;

Maneerit 2003; Nikolaou 2017; Sato 2012; Zyluk 2011). Bamroongshawgasame 2010, Kloeters 2016 and Nikolaou 2017 reported that the participants had presented trigger finger symptoms for at least three months; Callegari 2011 reported an average time of 3.5 months (range: 1 to 6 months). Two studies reported that the participants had, on average, shown symptoms for four months (Chao 2009; Maneerit 2003). Dierks 2008 reported that the participants subjected to percutaneous surgery had, on average, shown symptoms for seven months (range: 1 to 36), while in the group subjected to open surgery, the average had been 12 months (range: 1 to 60 months). Gilberts 2001 reported that on average the timing of intervention had been six months (range: 1 to 24 months) in the group subjected to percutaneous surgery and 12 months (range: 1 to 144 months) in the open surgery group. Hansen 2017 reported that the average time for performing intervention after the beginning of symptoms was four months in the open surgery group and five months in the steroid injection group. Sato 2012 reported average time of 15 months in the percutaneous surgery group, 10.5 months in the open surgery group and 11.8 months in the steroid injection group. Zyluk 2011 reported that the average time for performing intervention after the beginning of symptoms was five months in the percutaneous surgery group and six months in the steroid injection group. Three studies did not report any data on the timing of intervention (Aref 2014; Pegoli 2008; Singh 2005).

Interventions

Based on surgical intervention methods, we grouped the studies in nine comparison groups:

Comparison 1: open surgery versus steroid injection (Hansen 2017; Sato 2012). Follow-up data were available for 269 participants, totalling 270 fingers (140 with open surgery and 130 with steroid injection). In total 12 participants (12 digits) were follow-up loss in Hansen 2017: seven participants (seven digits) did not receive allocated intervention - six in open surgery group and one in steroid injection group -, and five participants (five fingers) did not complete the follow-up - two in the open surgery group and three in the steroid injection group.

Comparison 2: percutaneous surgery versus steroid injection (Aref 2014; Chao 2009; Sato 2012; Singh 2005; Zyluk 2011). Follow-up data were available for 344 participants, totalling 368 fingers (176 with percutaneous surgery and 192 with steroid injection). Two studies had follow-up loss (Chao 2009; Zyluk 2011). In Chao 2009 three participants (four fingers) did not complete the follow-up, with one participant (one finger) in the percutaneous surgery group and two participants (three fingers) in the steroid injection group. In Zyluk 2011 20 participants did not complete the follow-up, in which 12 were in the percutaneous surgery group and eight in the steroid injection group.

Comparison 3: open surgery versus steroid injection plus ultrasound-guided hyaluronic acid injection (Callegari 2011). Follow-up data were available for 30 participants, totalling 30 fingers (15 with open surgery and 15 with steroid injection plus ultrasound-guided hyaluronic acid injection).

Comparison 4: percutaneous surgery plus steroid injection versus steroid injection (Maneerit 2003). Follow-up data were available for 113 participants, totalling 125 fingers (65 with percutaneous surgery plus steroid injection and 60 with steroid injection). Two participants (two fingers), with one in each group, did not complete the follow-up.

Comparison 5: percutaneous surgery versus open surgery (Bamroongshawgasame 2010; Dierks 2008; Gilberts 2001; Nikolaou 2017; Sato 2012). Follow-up data were available for 402 participants, totalling 429 fingers (215 with percutaneous surgery and 214 with open surgery).

Comparison 6: endoscopic surgery versus open surgery (Pegoli 2008). Follow-up data were available for 200 participants, totalling 231 fingers (114 with endoscopic release and 117 with open surgery).

Comparison 7: open surgery by transversal incision of the skin about 2-3 mm distally from the distal palmar crease versus open surgery by longitudinal incision of the skin at the level of the A1-pulley without crossing the proximal distal palmar crease (Kloeters 2016). Follow-up data were available for 20 participants, totalling 21 fingers (10 with open surgery by transversal incision of the skin about 2-3 mm distally from distal palmar crease and 11 open surgery by longitudinal incision of the skin).

Comparison 8: open surgery by transversal incision of the skin in the distal palmar crease versus open surgery by longitudinal incision of the skin at the level of the A1-pulley without crossing the distal palmar crease proximal (Kloeters 2016). Follow-up data were available for 20 participants, totalling 22 fingers (11 with open surgery by transversal incision of the skin in the distal palmar crease and 11 open surgeries by longitudinal incision of the skin).

Comparison 9: open surgery by transversal incision of the skin in the distal palmar crease versus open surgery by transversal incision of the skin about 2-3 mm distally from distal palmar crease (Kloeters 2016). Follow-up data were available for 20 participants, totalling 21 fingers (11 with open surgery by transversal incision of the skin in the distal palmar crease and 10 open surgeries by transversal incision of the skin about 2-3 mm distally from distal palmar crease).

Outcome measures

The trials varied in their follow-up times. Twelve studies stipulated follow-up time points (Bamroongshawgasame 2010; Callegari 2011; Chao 2009; Dierks 2008; Gilberts 2001; Hansen 2017; Kloeters 2016; Nikolaou 2017; Pegoli 2008; Sato 2012; Singh 2005; Zyluk 2011); one trial reported mean follow-up of 23 months (six to 42 months) and was considered long term (Maneerit 2003); one trial did not clearly specify the follow-up period, but reported weekly evaluations of the participants

in the first six weeks and cases of recurrence with up to nine months of follow-up (long term) (Aref 2014). Five trials were short term (Bamroongshawgasame 2010; Dierks 2008; Gilberts 2001; Nikolaou 2017; Pegoli 2008); Bamroongshawgasame 2010 reported follow-up data for eight weeks, while Dierks 2008, Gilberts 2001; Nikolaou 2017 and Pegoli 2008 conducted follow-up to 12 weeks. Two trials presented data for six months (intermediate term) (Sato 2012; Zyluk 2011). Five trials related follow-up data for one year (long term) (Callegari 2011; Chao 2009; Hansen 2017; Kloeters 2016; Singh 2005).

Major outcomes

Resolution of trigger finger

Resolution of trigger finger was assessed by ten trials (Bamroongshawgasame 2010; Callegari 2011; Chao 2009; Dierks 2008; Gilberts 2001; Hansen 2017; Maneerit 2003; Nikolaou 2017; Pegoli 2008; Sato 2012). The resolution definition was heterogeneous among the studies and some authors reported it as "successful treatment", "healing" or "satisfactory results". Bamroongshawgasame 2010 considered successful trigger finger treatment as the relief of pain and the cessation of finger locking after the procedure. Callegari 2011 considered satisfactory results as the remission of symptoms within six weeks, with no recurrence within six months. Chao 2009 and Maneerit 2003 considered as satisfactory the participants who progressed with pain score lower than or equal to one (VAS scale) and cessation of triggering. Dierks 2008 considered successful treatment as the complete relief of symptoms. Gilberts 2001 assessed the success of the treatment as the cessation of triggering, with no recurrence during follow-up (three months). Hansen 2017 considered cure if cessation of blockage was maintained after 12 months of the treatment. Nikolaou 2017 reported resolution as the "success rate" per digit after the procedure. Pegoli 2008 considered resolution as the disappearance of triggering after the procedure. Sato 2012 described trigger finger healing as the remission of symptoms with the cessation of blockage with no recurrence within six months. Aref 2014, Kloeters 2016, Singh 2005 and Zyluk 2011 did not evaluate this primary endpoint.

Severity or incidence of pain

Thirteen trials reported pain (Aref 2014; Bamroongshawgasame 2010; Callegari 2011; Chao 2009; Dierks 2008; Gilberts 2001; Hansen 2017; Maneerit 2003; Nikolaou 2017; Pegoli 2008; Sato 2012; Singh 2005; Zyluk 2011), but only eight studies assessed pain in the hand after the procedure and published data (Bamroongshawgasame 2010; Callegari 2011; Chao 2009; Dierks 2008; Hansen 2017; Maneerit 2003; Sato 2012; Zyluk 2011); only two studies assessed it through continuous measurements and reported complete data (Chao 2009; Dierks 2008). Aref 2014 reported that pain was assessed using the VAS scale, but did not report the data. Bamroongshawgasame 2010 used a zero to three score scale, but the data reported in an inaccurate chart was incomplete as it did not report the exact values and standard deviations. Callegari 2011, Chao 2009, Maneerit 2003 and Zyluk 2011 used a VAS scale with a range of 0 to 10 cm, but Callegari 2011, Maneerit 2003 and Zyluk 2011 did not report the standard deviations. Dierks 2008 assessed pain using a 1 to 6 scale. Hansen 2017 reported that pain was assessed using a 1 to 10 scale, but did not report the standard deviations. Sato 2012 reported pain where the procedure was performed (topical pain), assessed through dichotomized "yes or no" (presence or absence of pain). Gilberts 2001, Nikolaou 2017 and Pegoli 2008 reported the average postoperative pain duration in days. Singh 2005 reported pain assessment but did not describe what method was used and did not report the data. Kloeters 2016 did not measure any this outcome.

Functional status of the hand

Only three trials - Callegari 2011, Kloeters 2016 and Nikolaou 2017 - evaluated functional status of the hand by validated instruments, and they used Disabilities of the Arm, Shoulder and Hand (DASH or QuickDASH) questionnaire; Callegari 2011 and Kloeters 2016 used the DASH questionnaire, while Nikolaou 2017 assessed the data using the QuickDASH questionnaire. Kloeters 2016 reported complete data about DASH, informing the respective standard error means to each DASH score; Callegari 2011 and Nikolaou 2017 did not report any variance measure. Aref 2014, Bamroongshawgasame 2010, Chao 2009, Dierks 2008, Gilberts 2001, Hansen 2017, Maneerit 2003, Pegoli 2008, Sato 2012, Singh 2005 and Zyluk 2011 did not evaluate this outcome.

Participant-reported treatment success or satisfaction

Only four trials assessed post-treatment patient satisfaction (Aref 2014; Bamroongshawgasame 2010; Callegari 2011; Singh 2005), but two trials reported the data incompletely (Bamroongshawgasame 2010; Callegari 2011), and two trials did not report the data (Aref 2014; Singh 2005). Bamroongshawgasame 2010 measured patient satisfaction using a 0 to 3 score (0 = unsatisfied, 1 = somewhat satisfied, 2 = satisfied and 3 = very satisfied), and Callegari 2011 used a visual satisfaction scale (SVAS) gradated from 0 to 10. The other ten trials did not assess participant-reported treatment success or satisfaction (Chao 2009; Dierks 2008; Gilberts 2001; Hansen 2017; Kloeters 2016; Maneerit 2003; Nikolaou 2017; Pegoli 2008; Sato 2012; Zyluk 2011).

Frequency of recurrence of triggering or locking of the affected fingers

Eight studies reported direct data on the recurrence of trigger finger (Aref 2014; Bamroongshawgasame 2010; Callegari 2011; Gilberts 2001; Hansen 2017; Sato 2012; Singh 2005; Zyluk 2011). Aref 2014, Bamroongshawgasame 2010, Gilberts 2001, Hansen 2017 and Singh 2005 reported the recurrence of triggering, but did not define it. Callegari 2011 considered recurrence as the return of any degree of triggering after a full remission period of trigger finger. Sato 2012 defined recurrence (relapse) as the return of finger locking within six months of follow-up. Zyluk 2011 considered recurrence of triggering as the return to the baseline grade of triggering, after a period of total or partial improvement. Two studies did not evaluate the recurrence of triggering as a study outcome, but published indirect data on it (Chao 2009; Dierks 2008): Chao 2009 reported on participants who again experienced pain and relapse of triggering after a period of remission of the symptoms, which we consider as recurrence; Dierks 2008 reported that all participants had relief from the symptoms for 12 weeks (final study follow-up). Kloeters 2016, Maneerit 2003, Nikolaou 2017 and Pegoli 2008 did not report or provide data on recurrence.

Number of patients experiencing any adverse event

All assessed trials referred to some adverse event, except Kloeters 2016 which did not publish any data about adverse event. Aref 2014 assessed finger stiffness, tendon bowstringing (pulley injury), dysaesthesia, and skin atrophy or skin hypopigmentation. Bamroongshawgasame 2010 assessed A2 pulley injury. Callegari 2011 assessed abnormal flexion of the finger and algodystrophic syndrome after the procedure. Chao 2009 assessed infection and tendon bowstringing (pulley injury). Dierks 2008 observed transient inflammation. Gilberts 2001 assessed haematoma and diffuse swelling of the operated digit, and adherence of flexor tendon. Hansen 2017 assessed infection, tendon bowstringing (pulley injury), digit flare after procedure, fat necrosis in digit and tendon rupture. Maneerit 2003 assessed infection and partial loss of flexion of the finger after treatment. Pegoli 2008 assessed infection and dysaesthesia. Nikolaou 2017 assessed infection and partial loss of movement in operated digit. Sato 2012 assessed the presence of infection and rupture of the flexor tendon after the procedure. Singh 2005 assessed stiffness of the fingers, tendon bowstringing (pulley injury), and dysaesthesia. Zyluk 2011 measured the active range of motion of the fingers; the authors reported on infection and algodystrophic syndrome incompletely as they stated that there was no case in which these complications occurred in the steroid injection group, but the authors did not mention whether these complications occurred in the percutaneous surgery group.

Neurovascular injury

Nine trials assessed neurovascular injury, although Zyluk 2011 only reported data on one of the comparison groups (Bamroongshawgasame 2010; Chao 2009; Dierks 2008; Gilberts 2001; Hansen 2017; Maneerit 2003; Pegoli 2008; Sato 2012; Zyluk 2011). Five studies did not assess neurovascular injury (Aref 2014; Callegari 2011; Kloeters 2016; Nikolaou 2017; Singh 2005).

Excluded studies

We excluded 15 studies because they did not fulfil our inclusion criteria. The reasons for exclusion are supplied in Characteristics of excluded studies.

Studies awaiting classification

There are no studies awaiting classification.

Ongoing studies

Our search regarding ongoing trials (15 September 2017) found 20 records on Clinicaltrials.gov (U.S. National Institute of Health) and 39 records on the World Health Organization (WHO) International Clinical Trial Registry Platform, a total of 59 records. Excluding the duplicate registers (N = 20) and studies related to other subjects (N = 30), six did not fulfil our inclusion criteria, leaving three trials (NTR1135; TCTR20140529001; TCTR20150416001) to be included in an update of this review.
The ongoing study NTR1135 is a multicentre randomised trial with two intervention groups. This ongoing study is taking place in the Netherlands and it should enrol a total of 490 participants.
The ongoing study TCTR20140529001 is a single-centre randomised trial with two intervention groups. This ongoing study is taking place in Thailand and it should enrol a total of 128 participants.
The ongoing study TCTR20150416001 is a single-centre randomised trial with two intervention groups. This ongoing study is taking place in Thailand and it should enrol a total of 51 participants.
We report the details of the ongoing studies in Characteristics of ongoing studies.

Risk of bias in included studies

The 14 trials had many methodological flaws and were considered at high risk of bias (Figure 2, Figure 3 and Characteristics of included studies).

Figure 2. Risk of bias graph: review authors' judgements about each risk of bias item presented as percentages across all included studies.

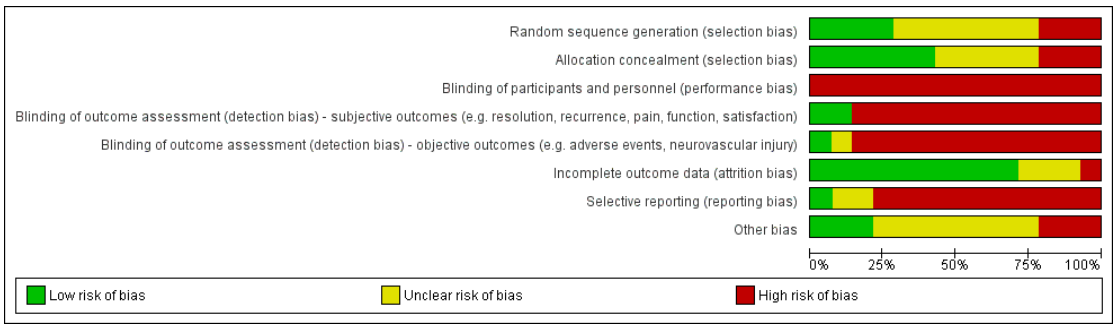
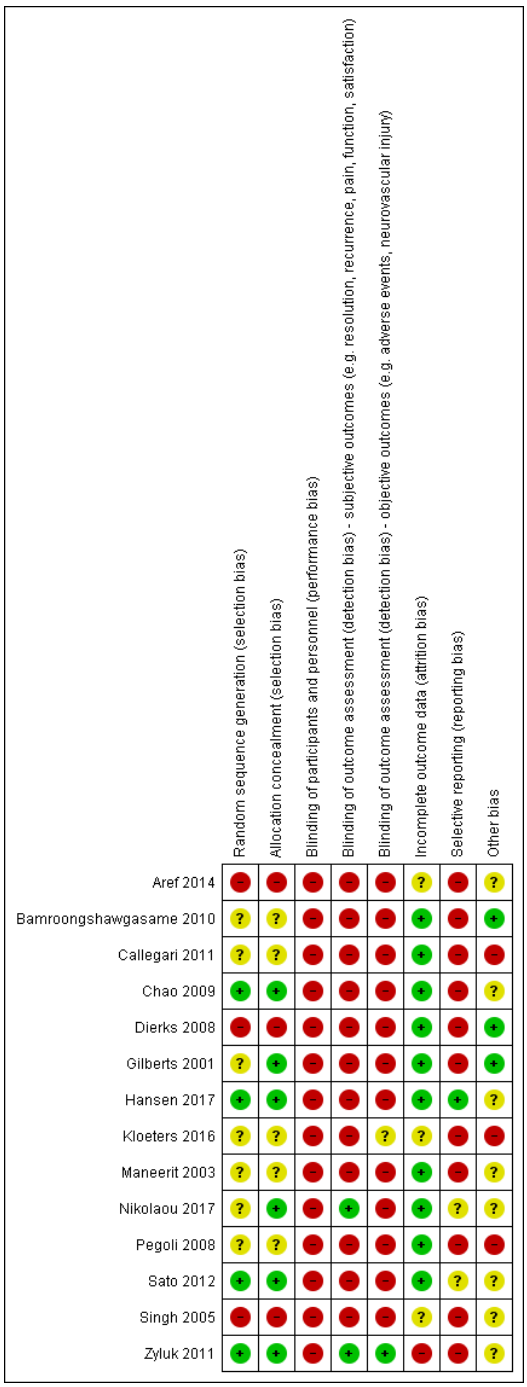


Figure 3. Risk of bias summary: review authors' judgements about each risk of bias item for each included study.



When we estimated the presence of bias for small studies in the overall meta-analysis by checking whether the results of the outcomes change in the analyses using random-effects or fixed-effect (Sterne 2011), there were changes in five analyses in two comparisons - one analysis in the comparison between open surgery and steroid injection, and four analyses in the comparison of percutaneous surgery versus steroid injection -, and there were no changes in results in the other seven comparisons. In comparison 1 (open surgery versus steroid injection) the outcome resolution of symptoms (six to 12 months) did not differ between groups in the random-effects analysis (RR 1.48, 95% CI 0.79 to 2.76) and was favourable to the open surgery group in the fixed-effect analysis (RR 1.51, 95% CI 1.31 to 1.73) (Analysis 1.1). In comparison 2 (percutaneous surgery versus steroid injection) the outcome resolution of symptoms (six to 12 months) did not differ between groups in the random-effects analysis (RR 2.11, 95% CI 0.31 to 14.51) and was favourable to the percutaneous surgery group in the fixed-effect analysis (RR 1.77, 95% CI 1.48 to 2.12) (Analysis 2.1). Short-term pain (one month) showed no difference between groups in the random-effects analysis (RR −1.80, 95% CI −5.72 to 2.12), but was favourable to the percutaneous surgery group in the fixed-effect analysis (RR −1.46, 95% CI −1.81 to −1.11) (Analysis 2.2.1). The outcome recurrence (range six to 12 months) showed no difference between groups in the random-effects analysis (RR 0.57, 95% CI 0.21 to 1.59), but was favourable to the percutaneous surgery group in the fixed-effect analysis (RR 0.60, 95% CI 0.37 to 0.96) (Analysis 2.4). Adverse event 'partial loss of movement' showed no difference between groups in the random-effects analysis (RR 3.09, 95% CI 0.87 to 10.97) and was favourable to the steroid injection group in the fixed-effect analysis (RR 2.93, 95% CI 1.41 to 6.07) (Analysis 2.5.2).

Allocation

Chao 2009 and Zyluk 2011 described that the generation of random sequence was accomplished by selecting number one or two from sealed envelopes in the presence of a witness and in Sato 2012 it was done by means of a six-sided die with two sides representing one of the three treatments, drawn prior to beginning the study by a person not involved in the research; in Hansen 2017 the generation of the random sequence was done by using the Research Randomizer software (Research Randomizer). Three trials were considered quasi-randomised (Aref 2014; Dierks 2008; Singh 2005); Aref 2014 and Singh 2005 allocated participants based on their year of birth; in Dierks 2008 they were allocated by the register number. The seven remaining trials did not provide enough information about how the random sequence generation was done (Bamroongshawgasame 2010; Callegari 2011; Gilberts 2001; Kloeters 2016; Maneerit 2003; Nikolaou 2017; Pegoli 2008).

Allocation concealment before the assignment was adequate for Chao 2009, Gilberts 2001, Hansen 2017, Nikolaou 2017, Sato 2012 and Zyluk 2011 (sealed envelopes). Aref 2014, Dierks 2008 and Singh 2005 were quasi-randomised. Bamroongshawgasame 2010, Callegari 2011, Kloeters 2016, Maneerit 2003 and Pegoli 2008 did not describe their allocation concealment methods.

Blinding

We considered all trials to be at high risk of performance bias (Aref 2014; Bamroongshawgasame 2010; Callegari 2011; Chao 2009; Dierks 2008; Gilberts 2001; Hansen 2017; Kloeters 2016; Maneerit 2003; Nikolaou 2017; Pegoli 2008; Sato 2012; Singh 2005; Zyluk 2011). Since all of the included studies compared different surgical techniques with or without corticoid injection, it was not possible to provide blind treatment. The participants were not blinded in any of the trials regarding the procedure performed. Detection bias was considered blinding separately for self-reported subjective outcomes (e.g. resolution of symptoms, pain, function, patient satisfaction, recurrence) and objective outcomes (e.g. adverse events, neurovascular injury). Twelve trials did not blind the assessors for self-reported subjective outcomes and they were considered at high risk of bias (Aref 2014; Bamroongshawgasame 2010; Callegari 2011; Chao 2009; Dierks 2008; Gilberts 2001; Hansen 2017; Kloeters 2016; Maneerit 2003; Pegoli 2008; Sato 2012; Singh 2005); two trials blinded the assessors to the self-reported subjective outcomes and they were considered at low risk of bias (Nikolaou 2017; Zyluk 2011). Twelve trials did not blind the assessors for objective outcomes and they were considered at high risk of bias (Aref 2014; Bamroongshawgasame 2010; Callegari 2011; Chao 2009; Dierks 2008; Gilberts 2001; Hansen 2017; Maneerit 2003; Nikolaou 2017; Pegoli 2008; Sato 2012; Singh 2005); only one trial blinded the assessors to the objective outcomes and it was considered as at low risk of bias (Zyluk 2011). It was possibly because Zyluk 2011 compared percutaneous surgery (using needle, without incision) with steroid injection. One trial (Kloeters 2016) did not assess or report any objective outcome and was considered unclear risk of bias.

Incomplete outcome data

We judged trials to be at low risk of bias if follow-up was completed by more than 80% of participants, missing data were balanced in the groups and an intention-to-treat analysis was described for the primary outcomes. Ten trials were considered at low risk of attrition bias (Bamroongshawgasame 2010; Callegari 2011; Chao 2009; Dierks 2008; Gilberts 2001; Hansen 2017; Maneerit 2003; Nikolaou 2017; Pegoli 2008; Sato 2012); and one was at high risk

(Zyluk 2011). Aref 2014, Kloeters 2016 and Singh 2005 were at unclear risk.

Bamroongshawgasame 2010, Callegari 2011, Dierks 2008, Gilberts 2001, Nikolaou 2017, Pegoli 2008 and Sato 2012 reported no losses to follow-up. Chao 2009, Hansen 2017 and Maneerit 2003 were judged to be at low risk of bias because the data loss was small and balanced in both groups; in Chao 2009 the data loss was one (2%) and three (6%) respectively, in percutaneous surgery and steroid injection groups; in Hansen 2017 eight participants (9%) in open surgery group and four (5%) in steroid injection group were allocated to treatment, but they did not receive the allocated treatment or they did not complete to follow up of 12 months; and in Maneerit 2003 the data loss was one (1.5%) and one (1.6%) respectively in percutaneous surgery plus steroid injection and steroid injection groups.

Zyluk 2011 was judged as high risk despite a follow-up loss of 17% (20/115 participants), because the loss in the percutaneous surgery group was significantly higher than in the steroid injection group, 12 (22%) and eight (13%) respectively, and the intention-to-treat analysis was not carried out. Aref 2014, Kloeters 2016 and Singh 2005 were judged as unclear risk because they did not clearly report if there was a follow-up loss of participants during the study.

Selective reporting

Only one trial (Hansen 2017) was considered at low risk regarding reporting bias; Hansen 2017 published the protocol before the recruitment of participants began and always followed the protocoled methodology.

Eleven trials did not publish a prior protocol specifying the study's results of interest and were considered at high risk of bias (Aref 2014; Bamroongshawgasame 2010; Callegari 2011; Chao 2009; Dierks 2008; Gilberts 2001; Kloeters 2016; Maneerit 2003; Pegoli 2008; Singh 2005; Zyluk 2011). Aref 2014 and Singh 2005 did not report results of interest, such as resolution, pain and functional status of the hand; Bamroongshawgasame 2010, Gilberts 2001 and Pegoli 2008 did not assess functional status of the hand and assessed pain through non-validated measures. Callegari 2011 reported incomplete outcomes of pain and functional status of the hand because, although the VAS and DASH values were provided, the respective standard deviations were not provided. Chao 2009 and Dierks 2008 did not assess functional status, an outcome of interest in the review. Kloeters 2016 did not assess results of interest, such as resolution and pain. Maneerit 2003 did not assess the functional hand status and incompletely reported pain, because although the VAS value was provided, the standard deviation value was not reported. Zyluk 2011 did not assess resolution and functional hand status, and pain were reported incompletely, because although the VAS value was provided, the standard deviation value was not reported.

Two trials (Nikolaou 2017; Sato 2012) were considered as unclear risk of bias. Nikolaou 2017 published the study on February 18, 2017, after the protocol was published on July 6, 2016, but was considered as uncertain risk of bias for having submitted the finalized study for evaluation by the editorial board of the journal on July 4, 2016, two days prior to the publication of the protocol. Sato 2012 was considered as unclear risk of bias because although its protocol was available before the publication of the trial, the study protocol was published on 4 October 2010 and the study started on 1 November 2002 and was concluded on 3 March 2007 (Sato 2012).

Other potential sources of bias

Three trials were considered at low risk for 'other bias' (Bamroongshawgasame 2010; Dierks 2008; Gilberts 2001). Three trials were considered at high risk of other potential bias (Callegari 2011; Kloeters 2016; Pegoli 2008). Rehabilitation differences were reported in Callegari 2011. Kloeters 2016 and Pegoli 2008 presented imbalance between groups: in Kloeters 2016 there was a significant difference in baseline DASH scores between groups, and in Pegoli 2008 there was baseline imbalance between the groups regarding the presence of associated diseases (38% in the open surgery group and 14% in the endoscopic surgery group), which were operated concomitantly with trigger finger.

Eight trials were considered at unclear risk of other biases (Aref 2014; Chao 2009; Hansen 2017; Maneerit 2003; Nikolaou 2017; Sato 2012; Singh 2005; Zyluk 2011); Aref 2014, Nikolaou 2017 and Singh 2005 did not provide data on baseline balance, rehabilitation and care providers; Chao 2009, Hansen 2017, Maneerit 2003 and Sato 2012 reported no information on rehabilitation or care providers, or both. Zyluk 2011 did not report any data about rehabilitation.

Effects of interventions

See: **Summary of findings for the main comparison** Open surgery versus steroid injection for treating trigger finger; **Summary of findings 2** Percutaneous surgery versus steroid injection for treating trigger finger; **Summary of findings 3** Open surgery versus steroid injection plus hyaluronic acid injection guided by ultrasound for treating trigger finger; **Summary of findings 4** Percutaneous surgery plus steroid injection compared to steroid injection for trigger finger; **Summary of findings 5** Percutaneous surgery versus open surgery for treating trigger finger; **Summary of findings 6** Endoscopic surgery versus open surgery for treating trigger finger; **Summary of findings 7** Open surgery by transverse incision of the skin about 2-3 mm distally from distal palmar crease compared to open surgery by longitudinal incision of the skin for trigger finger; **Summary of findings 8** Open surgery by transverse incision of the skin in the distal palmar crease compared to open surgery by longitudinal incision of the skin for trigger finger; **Summary of findings 9**

Open surgery by transverse incision of the skin in the distal palmar crease compared to open surgery by transverse incision of the skin about 2-3 mm distally from distal palmar crease for trigger finger

We considered as comparison any surgical intervention versus another surgical intervention or versus any conservative intervention: open surgery versus steroid injection; percutaneous surgery versus steroid injection; open surgery versus steroid injection plus hyaluronic acid injection guided by ultrasound; percutaneous surgery plus steroid injection versus steroid injection; percutaneous surgery versus open surgery; endoscopic surgery versus open surgery; open surgery by transversal incision of the skin about 2-3 mm distally from distal palmar crease versus open surgery by longitudinal incision of the skin at the level of the A1-pulley without crossing the distal palmar crease proximal; open surgery by transversal incision of the skin in the distal palmar crease versus open surgery by longitudinal incision of the skin at the level of the A1-pulley without crossing the distal palmar crease proximal; and open surgery by transversal incision of the skin in the distal palmar crease versus open surgery by transversal incision of the skin about 2-3 mm distally from distal palmar crease. We considered as primary comparison 'open surgery versus steroid injection', because open surgery is the oldest surgical method used for the treatment of trigger finger, while the steroid injection is the least invasive method reported in the studies included.

We present all outcomes in the 'Summary of findings' tables (Summary of findings for the main comparison; Summary of findings 2; Summary of findings 3; Summary of findings 4; Summary of findings 5; Summary of findings 6; Summary of findings 7; Summary of findings 8; Summary of findings 9).

Comparison 1: open surgery versus steroid injection

Two trials reported outcomes for the comparison of open surgery versus steroid injection (Hansen 2017; Sato 2012). Hansen 2017 performed the ultrasonic guided infiltration, while Sato 2012 performed infiltration without the use of ultrasound. The most relevant data regarding this comparison are shown in Summary of findings for the main comparison.

Resolution of trigger finger

The combined analysis of the results of Hansen 2017 and Sato 2012 comparing the open surgery and steroid injection groups (after one or more injections) showed no differences between the two comparison groups (131/140 versus 80/130; RR 1.48, 95% CI 0.79 to 2.76; I^2 = 95%), although the two individual studies showed favourable individual results for open surgery but high heterogeneity due to lack of overlapping confidence intervals (see Analysis 1.1). Hansen 2017 had 12 participants (8 versus 4) lost to follow-up and was considered as a resolution failure.

When the results were subgrouped by time periods (short, intermediate or long term) for exploratory purposes, the subgroup trials showed differences between groups (Chi^2 = 17.14, df = 2 (P = 0.0002), I^2 = 88.3%) (see Analysis 1.7) (Hansen 2017; Sato 2012). Hansen 2017 assessed the results comparing open surgery with short-term infiltration and the results analysis showed no difference between groups (76/84 versus 68/81; RR 1.08, 95% CI 0.96 to 1.21); Sato 2012 reported intermediate-term results and the data analysis showed differences in favour of the open surgery group when compared with steroid injections (56/56 versus 42/49; RR 1.17, 95% Cl 1.04 to 1.31); in the long-term assessment the results analysis of Hansen 2017, comparing open surgery with infiltration, showed difference in favour of the open surgery group (75/84 versus 38/81; RR 1.90, 95% CI 1.49 to 2.43) (see Analysis 1.7).

Severity or incidence of pain

Hansen 2017 and Sato 2012 reported pain. Hansen 2017 assessed by a numerical rating scale from 1 to 10 (1 = no pain, and 10 = worst imaginable pain) and reported the median and interquartile range (IQR) before treatment and after three and 12 months follow-up, but did not report the mean and standard deviation; the median in baseline was 6 (IQR = 5-7) in both groups; no difference between groups was reported in Hansen 2017 at three months follow-up, with median 1 (IQR = 1-2) in the open surgery group and 1 (IQR 1-1) in the steroid injection group; at 12 months follow-up differences in favor of the open surgery group was reported in Hansen 2017, that found median 1 (IQR 1-1) in the open surgery group and 3 (IQR = 1-5) in the steroid injection group (P < 0.05). Analyses were realized using the median as an approximate for the mean, and the IQR to estimate an approximate standard deviations: the results' analyses of Hansen 2017 comparing open surgery and steroid injection groups showed no differences between the two comparison groups in short-term (at three months follow-up) (MD 0.00, 95% CI −0.23 to 0.23, 1 to 10-point scale where 1 means no pain and 10 worst imaginable pain), but it was favourable to open surgery group in long-term (at 12 months follow-up) (MD -2.00, 95% CI −2.68 to -1.32), with clinically significant differences (Analysis 1.3).

Sato 2012 assessed the presence of pain in the palm of the hand after the procedure, and the results analysis showed significantly more participants feeling pain in the palm of the hand in the open surgery group than in the steroid injection group in short-term follow-up at one week (38/56 versus 9/49; RR 3.69, 95% CI 1.99 to 6.85), but no significant difference between groups was found in intermediate-term follow-up at six months (0/56 versus 4/49; RR 0.10, 95% CI 0.01 to 1.77) (Analysis 1.2).

Function or disability

No data about function or disability was assessed in Hansen 2017 or Sato 2012.

Participant-reported treatment success or satisfaction

No data about patient satisfaction was assessed in Hansen 2017 or Sato 2012.

Recurrence of triggering

The pooled results analysis of Hansen 2017 and Sato 2012 showed a significant difference in favour of the open surgery group when compared with the steroid injection group at the end of follow-up (8/140 versus 50/130; RR 0.17, 95% CI 0.09 to 0.33; Chi^2 = 0.59, df = 1 (P = 0.44); I^2 = 0%) (see Analysis 1.4). Hansen 2017 had a loss of follow-up of 12 participants (8 versus 4), which we considered as recurrence events.

When the results were subgrouped by time of outcome measurement (short, intermediate or long term) for exploratory purposes, no trial was short term in this comparison. One trial was intermediate term and marginal differences were identified in favour of the open surgery group (0/56 versus 7/49; RR 0.06, 95% CI 0.00 to 1.00) (see Analysis 1.8) (Sato 2012). In the long term assessment the results analysis of Hansen 2017 showed a significant difference in favour of the open surgery group (8/84 versus 43/81; RR 0.18, 95% CI 0.09 to 0.36) (see Analysis 1.8).

Adverse events

No significant differences between open surgery and steroid injection groups were noted in the combined results from Hansen 2017 and Sato 2012 for adverse events (18/140 versus 17/130; RR 1.02, 95% CI 0.57 to 1.84) (see Analysis 1.5). Twelve participants (8 versus 4) did not complete the follow-up in Hansen 2017, and were considered as adverse events in the data analysis.

Analyses by types of adverse events indicated that no significant difference between groups was observed for infection (11/140 versus 4/130; RR 2.65, 95% CI 0.88 to 7.99); there was no tendon or pulley injury in both groups (0/56 versus 0/49; risk ratio could not be estimated); there was no significant difference in the groups for flare around procedure site (8/84 versus 15/81; RR 0.51, 95% CI 0.23 to 1.15) and for fat necrosis at the procedure site (8/84 versus 6/81; RR 1.29, 95% CI 0.47 to 3.54), but there was significant differences in favour of the steroid injection group for cutaneous discomfort around procedure site after 12 months (15/84 versus 4/81; RR 3.62, 95% CI 1.25 to 10.44) (see Analysis 1.5).

Neurovascular injury

Only one case of neurovascular injury was reported in the combined results of two studies (Hansen 2017; Sato 2012), which occurred in the open surgery group, however Hansen 2017 had a loss of follow-up of 12 participants (8 versus 4), which we considered as neurovascular injury in the analysis. No statistically significant differences between the two groups were observed in the combined results analysis of Hansen 2017 and Sato 2012 (9/140 versus 4/130; RR 2.17, 95% CI 0.70 to 6.77) (see Analysis 1.6).

Comparison 2: percutaneous surgery versus steroid injection

Five studies reported outcomes comparing percutaneous surgery to steroid injection (Aref 2014; Chao 2009; Sato 2012; Singh 2005; Zyluk 2011). The most relevant information on the outcomes of this comparison is classified in Summary of findings 2.

Resolution of trigger finger

Two studies assessed the resolution and the combined analysis of the results comparing the percutaneous surgery and steroid injection groups (after one or more injections) showed no differences between the two comparison groups in six to 12 months follow-up (89/92 versus 54/99; RR 2.11, 95% CI 0.31 to 14.51; I^2 = 98%), although the two individual studies showed favourable individual results for percutaneous surgery but high heterogeneity due to lack of overlapping confidence intervals (see Analysis 2.1) (Chao 2009; Sato 2012). Chao 2009 had four participants (1 versus 3) lost to follow-up and was considered as a resolution failure.

When the results were subgrouped by time periods (short, intermediate or long term) for exploratory purposes, the subgroup trial showed differences between groups (Chi^2 = 30.82, df = 2 (P < 0.00001), I^2 = 93.5%). Chao 2009 assessed the results comparing percutaneous surgery with short-term infiltration and the results analysis showed differences in favour of the percutaneous surgery group (43/47 versus 21/50; RR 2.18, 95% CI 1.55 to 3.05). Sato 2012 reported intermediate-term results and the data analysis showed differences in favour of the percutaneous surgery group when compared with steroid injections (45/45 versus 42/49; RR 1.16, 95% Cl 1.03 to 1.31). In the long-term assessment the results analysis of Chao 2009, comparing percutaneous surgery with one or more infiltrations, showed difference in favour of the percutaneous surgery group (44/47 versus 12/50; RR 3.90, 95% CI 2.37 to 6.42) (see Analysis 2.7).

Severity or incidence of pain

Chao 2009, Sato 2012 and Zyluk 2011 reported pain. Two trials assessed pain using VAS score and the combined results' analysis showed no difference between groups in the short-term (MD −1.80, 95% CI −5.72 to 2.12; I^2 = 99%, 0 to 10-point scale where 0 means no pain and 10 severe pain) (see Analysis 2.2) (Chao 2009; Zyluk 2011); although no statistical difference was found between the groups, a decrease of 1.8 point in the VAS score could correspond to a clinical improvement in favour of percutaneous surgery. The study of Zyluk 2011 did not report the standard deviation, but was included in the meta-analysis with the same standard deviation reported by Chao 2009, as foreseen in the protocol by Ventin 2014. Zyluk 2011 reported significantly less pain in the percutaneous surgery group in the intermediate term, although the differences between the VAS scores are not clinically significant (mean VAS score at pre-treatment and six months were

respectively 3.5 and 0.4 for the percutaneous surgery group and 3.9 and 1.3 for the injection group; the standard deviation and P value were not reported). Chao 2009 assessed pain using VAS score in the long term (one year) and the results' analysis was favourable to percutaneous surgery (MD -6.50, 95% CI -7.25 to −5.75, 0 to 10-point scale), with clinically significant differences (see Analysis 2.2).

Sato 2012 assessed the presence of pain in the palm of the hand after the procedure and the results' analysis was favourable to the steroid injection group in short-term follow-up at one week (30/45 versus 9/49; RR 3.63, 95% CI 1.94 to 6.78); no significant difference between groups was found in the intermediate-term follow-up at six months (0/45 versus 4/49; RR 0.12, 95% CI 0.01 to 2.18) (see Analysis 2.3).

Function or disability

Function or disability was not measured by any instrument in Aref 2014, Chao 2009, Sato 2012, Singh 2005 or Zyluk 2011.

Participant-reported treatment success or satisfaction

No trial reported data about patient satisfaction.

Recurrence of triggering

Five trials reported triggering recurrence and the analysis of the combined results showed no differences between groups (22/189 versus 40/203; RR 0.57, 95% CI 0.21 to 1.59; I^2 = 62%) (Aref 2014; Chao 2009; Sato 2012; Singh 2005; Zyluk 2011); two trials had a pooled loss of follow-up of 24 participants (13 versus 11), which we considered as recurrence events (see Analysis 2.4) (Chao 2009; Zyluk 2011).

When the results' analysis was sub-grouped for follow-up, we observed no differences between the groups in the short term (12/58 versus 8/67; RR 1.73, 95% CI 0.76 to 3.94), in the intermediate term (12/103 versus 21/116; RR 0.37, 95% CI 0.02 to 5.50; I^2 = 73%) and in the long term (10/86 versus 19/87; RR 0.55; 95% CI 0.10 to 2.99; I^2 = 71%); the test for differences between subgroups showed no difference between the two interventions (Chi^2 = 2.30, df = 2 (P = 0.32), I^2 = 12.9%) (see Analysis 2.8).

Adverse events

The pooled results of five studies showed no statistically significant difference between the two groups in the analysis of total adverse events (26/189 versus 18/203; RR 1.58, 95% CI 0.91 to 2.75; I^2 = 0%) (Aref 2014; Chao 2009; Sato 2012; Singh 2005; Zyluk 2011); (see Analysis 2.5). Two studies had a total of 24 participants (13 versus 11) with follow-up loss, which were considered as adverse events (Chao 2009; Zyluk 2011).

Analyses by kinds of adverse events indicated no differences between the groups for infection (1/92 versus 3/99; RR 0.35, 95% CI 0.04 to 3.29), partial loss of movement (23/97 versus 8/104; RR 3.09, 95% CI 0.87 to 10.97) and tendon or pulley injury (3/131 versus 3/136; RR 1.00, 95% CI 0.21 to 4.81). Dysaesthesia was reported only in the steroid injection group, but there were no differences between the two comparison groups (0/39 versus 4/37; RR 0.20, 95% CI 0.02 to 1.67), and also skin atrophy or hypopigmentation (0/25 versus 3/25; RR 0.14, 95% CI 0.01 to 2.63) (see Analysis 2.5).

Neurovascular injury

No neurovascular injury cases of the participants who completed the follow-up were reported in the combined results of two studies (Chao 2009; Sato 2012), although four participants in the study of Chao 2009 did not complete the follow-up and were considered as having neurovascular injury. The analysis of the combined data showed no difference between the two groups (1/92 versus 3/99; RR 0.35, 95% CI 0.04 to 3.29) (see Analysis 2.6).

Comparison 3: open surgery versus steroid injection plus hyaluronic acid injection guided by ultrasound

Only one trial reported the outcomes comparing open surgery to steroid injection plus ultrasound-guided hyaluronic acid injection (Callegari 2011). The main information on this comparison is in Summary of findings 3.

Resolution of trigger finger

The results' analysis of Callegari 2011 showed no significant difference between the two groups at the six-month follow-up (15/15 versus 14/15; RR 1.07, 95% CI 0.89 to 1.28) and at the one-year follow-up (15/15 versus 11/15; RR 1.35, 95% CI 0.98 to 1.85) (see Analysis 3.1).

Severity of pain

Callegari 2011 assessed pain using the VAS score (VAS score: 0 to 10 points, where 0 means no pain and 10 severe pain), which found no statistically significant differences between the two intermediate-term groups (mean VAS in both groups was one point in six months and four points in the pre-treatment). The results could not be analysed because the standard deviation of VAS was not reported. There was no clinically significant difference between the pre-treatment groups and those with six months of follow-up.

Function or disability

The DASH scores (DASH score: 0% to 100%, where 0% means no disability and 100% means the most severe disability) at six months (intermediate-term), without a variance measure, were reported in Callegari 2011, which described a mean difference (MD) of 11% in the open surgery group and 13% in the injection

group. The pre-treatment DASH scores were 33% in the open surgery group and 31% in the injection group. There was no clinically significant difference between the pre-treatment groups and with six months of follow-up.

Participant-reported treatment success or satisfaction

Callegari 2011 measured patient satisfaction using the scoring system SVAS (Satisfaction Visual Analogue Scale: 0 to 10 points, where 0 means totally unsatisfied and 10 completely satisfied), but did not report the standard deviation; an average difference of 0.2 was found (8.4 in the open surgery group versus 8.2 in the injection group) with three months of follow-up and 0.4 (7.8 in open surgery group versus 7.4 in injection group) with six months of follow-up. There was no clinically significant difference between the pre-treatment groups and those with six months of follow-up.

Recurrence of triggering

There was no significant difference between the two groups in the results analysis for recurrence of trigger finger at six months of follow-up (0/15 versus 0/15; risk ratio could not be estimated) and at one year of follow-up (0/15 versus 3/15; RR 0.14, 95% CI 0.01 to 2.55) in Callegari 2011 (see Analysis 3.2).

Adverse events

No statistically significant differences were observed between the open surgery and injection groups in the data analysis of the total adverse events in Callegari 2011 (3/15 versus 1/15; RR 3.00, 95% CI 0.35 to 25.68); analysis by type of adverse events indicated that algodystrophic syndrome occurred only in the open surgery group (1/15 versus 0/15; RR 3.00, 95% CI 0.13 to 68.26). The partial loss of movement was more common in the open surgery group (2/15 versus 1/15; RR 2.00, 95% CI 0.20 to 19.78) (see Analysis 3.3).

Neurovascular injury

No data about neurovascular injury was reported by Callegari 2011.

Comparison 4: percutaneous surgery plus steroid injection versus steroid injection

Only one study reported results comparing percutaneous surgery plus steroid injection versus steroid injection (Maneerit 2003). The most relevant data regarding the outcome of this comparison are grouped in Summary of findings 4.

Resolution of trigger finger

Maneerit 2003 reported long-term results comparing percutaneous surgery plus steroid injection versus one or more steroid injections, and the analysis of the results was favourable to the percutaneous surgery plus steroid injection group (59/66 versus 36/61; RR 1.51, 95% CI 1.21 to 1.90) (see Analysis 4.1). Two participants (1 versus 1) did not complete follow-up and were considered as resolution failure in the data analysis.

Severity of pain

In Maneerit 2003 no significant differences between the short-term groups were found (mean VAS score zero to 10-scale at two weeks was 0.4 versus 0.3, with pre-treatment score of five in both groups; reported $P > 0.05$). Maneerit 2003 did not report the standard deviation, making it impossible to analyse the data. The difference of 0.1 point score between the groups is not a clinically significant difference.

Function or disability

No data about function or disability were assessed in Maneerit 2003.

Participant-reported treatment success or satisfaction

No data about patient satisfaction were assessed in Maneerit 2003.

Recurrence of triggering

No data about recurrence of triggering were reported by Maneerit 2003.

Adverse events

The data analysis of all adverse events in Maneerit 2003 showed no significant differences between the groups (2/66 versus 2/61; RR 0.92, 95% CI 0.13 to 6.36) (see Analysis 4.2). Two participants (1 versus 1) did not complete the follow-up and were considered as adverse events in the data analysis.

Analyses by kinds of adverse events did not differ between groups for infection (1/66 versus 2/61; RR 0.46, 95% CI 0.04 to 4.97) and partial loss of movement (2/66 versus 1/61; RR 1.85, 95% CI 0.17 to 19.87) (see Analysis 4.2). The test for subgroup differences showed no difference between the two groups ($Chi^2 = 0.65$, df = 1 ($P = 0.42$), $I^2 = 0\%$) (see Analysis 4.2).

Neurovascular injury

No neurovascular injury was reported by Maneerit 2003 in participants who concluded the follow-up but two participants (1 versus 1) did not complete follow-up and were considered as having neurovascular injury in the results analysis; there were no statistical

differences between the two comparison groups (1/66 versus 1/61; RR 0.92, 95% CI 0.06 to 14.46) (see Analysis 4.3).

Comparison 5: percutaneous surgery versus *open surgery*

Five studies reported data comparing percutaneous surgery versus open surgery (Bamroongshawgasame 2010; Dierks 2008; Gilberts 2001; Nikolaou 2017; Sato 2012). Nikolaou 2017 performed the percutaneous surgery guided by ultrasound, while in the other studies percutaneous surgery was performed without ultrasound visibility (Bamroongshawgasame 2010; Dierks 2008; Gilberts 2001; Sato 2012).The main information on the outcome of this comparison is in Summary of findings 5.

Resolution of trigger finger

Pooled data from five trials showed no significant difference in overall resolution at endpoint between the two groups (213/215 versus 213/214; RR 1.00, 95% CI 0.97 to 1.02; $Chi^2 = 1.60$, df = 4 (P = 0.81); $I^2 = 0\%$) (see Analysis 5.1) (Bamroongshawgasame 2010; Dierks 2008; Gilberts 2001; Nikolaou 2017; Sato 2012).
When the results were sub-grouped by time of outcome measurement (short, intermediate or long term) for exploratory purposes, four trials were short term and no statistically significant differences were identified between the two groups for resolution (168/170 versus 157/157; RR 1.00, 95% CI 0.97 to 1.02; $Chi^2 = 1.56$, df = 3 (P = 0.67); $I^2 = 0\%$) (see Analysis 5.6) (Bamroongshawgasame 2010; Dierks 2008; Gilberts 2001; Nikolaou 2017). Only one trial was intermediate term and no statistically significant difference was identified between the two groups for resolution (45/45 versus 56/56; RR 1.00, 95% CI 0.96 to 1.04) (see Analysis 5.6) (Sato 2012). In this comparison no trial was long term.

Severity or incidence of pain

Five trials reported pain (Bamroongshawgasame 2010; Dierks 2008; Gilberts 2001; Nikolaou 2017; Sato 2012). Data from Bamroongshawgasame 2010 on treatment pain were reported incompletely and shown by figure; therefore the results of this trial were not entered into the meta-analysis. The author reported no pain in both groups after six weeks.
The results' analysis of Dierks 2008 indicated no significant differences between percutaneous and open surgery groups at one week (MD 0.30, 95% CI −0.34 to 0.94; 1- to 6-point scale) or 12 weeks (MD 0.00, 95% CI −0.52 to 0.52; 1- to 6-point scale) (see Analysis 5.2). These differences are not clinically significant.
Gilberts 2001 assessed the mean duration of postoperative pain and reported 5.7 days (range 3 to 60) in the open surgery group and 3.1 days (range 0 to 21) in the percutaneous surgery group (P = 0.039). Nikolaou 2017 reported the mean time of analgesic use in days, which was 2.9 days in the open surgery group and 3.5 days in the group treated with percutaneous surgery (P > 0.05). Sato 2012 assessed the presence of pain in the palm of the hand after the procedure and the results' analysis showed no significant differences between the groups in the short term, after a week of follow-up (30/45 versus 38/56; RR 0.98, 95% CI 0.75 to 1.29) (see Analysis 5.3). In the intermediate time, the results' analysis of Sato 2012 showed no difference between the two groups too, at six months of follow-up (0/45 versus 0/56; risk ratio could not be estimated) (see Analysis 5.3).

Function or disability

Only Nikolaou 2017 reported data on function or disability of the hand, accessing the QuickDASH scores preoperatively and after the procedure, without a variance measure. The pre-treatment QuickDASH scores were 43.2 in the open surgery group and 45.5 in the percutaneous surgery group; in the follow-up after two, four and 12 weeks the QuickDASH scores were 8.2, 1.3 and 0 in the open surgery group, and 7.5, 0.5 and 0 in the percutaneous surgery group, respectively. There was no clinically significant difference between groups in all periods accessed (P > 0.05).
No data about function or disability was assessed in Bamroongshawgasame 2010, Dierks 2008, Gilberts 2001 or Sato 2012.

Participant-reported treatment success or satisfaction

Only Bamroongshawgasame 2010 assessed patient satisfaction and reported inaccurately, through a graphic representation, that 100% of patients in both groups were satisfied after three weeks of treatment (80/80 versus 80/80).
Other four trials did not assess any data for this outcome (Dierks 2008; Gilberts 2001; Nikolaou 2017; Sato 2012).

Recurrence of triggering

Four trials reported the recurrence of trigger finger and the combined data from these studies showed no significant differences between the percutaneous and open surgery groups at the end of follow-up (0/199 versus 1/198; RR 0.28, 0.01 to 6.83) (see Analysis 5.4) (Bamroongshawgasame 2010; Dierks 2008; Gilberts 2001; Sato 2012). When the studies were assessed for explanatory purposes, we observed that three trials did not show any cases of recurrence in both groups (0/145 versus 0/152) (Bamroongshawgasame 2010; Dierks 2008; Sato 2012). Only one trial reported the recurrence of triggering after two months in the open surgery group (0/54 versus 1/46) (Gilberts 2001). Bamroongshawgasame 2010, Dierks 2008 and Gilberts 2001 observed short-term results, while Sato 2012 observed intermediate-term results.
When the results were subgrouped by time of outcome measurement (short, intermediate or long-term) for exploratory purposes, three trials were short-term and no differences between the groups was observed (0/154 versus 1/142; RR 0.28, 95% CI 0.01 to 6.83)

(Bamroongshawgasame 2010; Dierks 2008; Gilberts 2001). One trial was intermediate-term and no differences was foud between groups (0/45 versus 0/56; risk ratio could not be estimated) (see Analysis 5.7) (Sato 2012). No trial was long-term in this comparison.

No data about recurrence of triggering were assessed in Nikolaou 2017.

Adverse events

No significant differences between percutaneous and open surgery groups were noted in the combined results for adverse events from five trials (Bamroongshawgasame 2010; Dierks 2008; Gilberts 2001; Nikolaou 2017; Sato 2012), and no heterogeneity was observed (I^2 = 0%) (3/215 versus 3/214; RR 0.80, 95% CI 0.17 to 3.68) (see Analysis 5.5).

Analyses by types of adverse events indicated that in both treatment groups there was no infection (0/61 versus 0/72; risk ratio could not be estimated), no partial loss of movement (0/16 versus 0/16; risk ratio could not be estimated), as well as tendon or pulley injury (0/125 versus 0/136; risk ratio could not be estimated). There was swelling, inflammation or haematoma in both groups and no significant differences (2/74 versus 2/62; RR 0.80, 95% CI 0.12 to 5.30; Chi^2 = 0.76, df = 1 (P = 0.38); I^2 = 0%). Adherence only occurred in the open surgery group (0/54 versus 1/46; RR 0.28, 95% CI 0.01 to 6.83). Other adverse events not specified by an author occurred in the percutaneous surgery group (1/54 versus 0/46; RR 2.56, 95% CI 0.11 to 61.45) (see Analysis 5.5) (Gilberts 2001).

Neurovascular injury

Combined data from four trials reported no neurovascular injury in both groups (0/199 versus 0/198) (Bamroongshawgasame 2010; Dierks 2008; Gilberts 2001; Sato 2012).

No data about neurovascular injury was reported by Nikolaou 2017.

Comparison 6: endoscopic surgery versus open surgery

Only one study compared endoscopic surgery versus open surgery (Pegoli 2008). The relevant data on the main outcomes of this comparison are listed in Summary of findings 6.

Resolution of trigger finger

The results' analysis of Pegoli 2008 indicated no significant differences in resolution between endoscopic and open surgery groups (114/114 versus 117/117; RR 1.00; 95% CI 0.98 to 1.02) (see Analysis 6.1).

Pain

Pegoli 2008 assessed the duration of pain, in days, and reported that the average pain time after the procedure was 23 days in the endoscopic surgery group and 45 days in the open surgery group.

Function or disability

No data about function or disability were assessed in Pegoli 2008.

Participant-reported treatment success or satisfaction

No data about patient satisfaction were assessed in Pegoli 2008.

Recurrence of triggering

There were no cases of recurrence of triggering in either group (0/114 versus 0/117).

Adverse events

No significant differences between endoscopic and open surgery groups were noted in the results' analysis for all adverse events in Pegoli 2008, although a higher number of complications was reported in the endoscopic surgery group when compared with the open surgery group (8/114 versus 3/117; RR 2.74, 95% CI 0.74 to 10.06) (see Analysis 6.2). Pegoli 2008 assessed dysaesthesia and infection events and all of the adverse event cases reported corresponded to dysaesthesia, while no infection cases were observed in either group (see Analysis 6.2).

Neurovascular injury

Pegoli 2008 reported neurovascular injury only in the endoscopic surgery group and no significant differences between groups were noted in the results analysis (1/114 versus 0/117; RR 3.08, 95% CI 0.13 to 74.79) (see Analysis 6.3).

Comparison 7: open surgery by transverse incision of the skin about 2-3 mm distally from distal palmar crease versus open surgery by longitudinal incision of the skin at the level of the A1-pulley without crossing the distal palmar crease proximal

Only one study compared open surgery by transverse incision of the skin about 2-3 mm distally from distal palmar crease versus open surgery by longitudinal incision of the skin at the level of the A1-pulley without crossing the proximal distal palmar crease (Kloeters 2016).

Kloeters 2016 assessed data on function or disability of the hand by DASH score. No data on resolution of trigger finger, pain, patient satisfaction, recurrence, adverse events or neurovascular injury were assessed in the trial.

The DASH scores (DASH score: 0 to 100, where 0 means no disability and 100 means the most severe disability) and respective mean standard error at preoperative baseline, and at one, three and 12 months follow-up were reported in Kloeters 2016. Analyzes of the results showed that although the baseline preoperative values of the DASH score were significantly lower in the open surgery group by transverse incision of the skin about 2-3 mm distally from distal palmar crease, no significant difference between the groups was observed at one (MD −1.50, 95% CI −19.19 to 16.19; 0- to 100-point scale), three (MD −2.00, 95% CI −16.45 to 12.45; 0- to 100-point scale) and 12 months follow-up (MD −8.90, 95% CI −23.35 to 5.55; 0- to 100-point scale) (see Analysis 7.1).

Comparison 8: open surgery by transverse incision of the skin in the distal palmar crease versus open surgery by longitudinal incision of the skin at the level of the A1-pulley without crossing the distal palmar crease proximal

Only one study compared open surgery by transverse incision of the skin in the distal palmar crease versus open surgery by longitudinal incision of the skin at the level of the A1-pulley without crossing the proximal distal palmar crease (Kloeters 2016).

Kloeters 2016 assessed data on function or disability of the hand by DASH score. No data regarding resolution of trigger finger, pain, patient satisfaction, recurrence, adverse events or neurovascular injury were assessed in the trial.

The DASH scores and respective standard error mean at preoperative baseline, and at one, three and 12 months follow-up were reported in Kloeters 2016. The analyzes of the results showed that there was no significant difference between the two comparison groups in the follow-up with one (MD 5.20, 95% CI −16.67 to 27.07; 0- to 100-point scale), three (MD 1.60, 95% CI −15.27 to 18.47; 0- to 100-point scale) and 12 months (MD 3.10, 95% CI −21.28 to 27.48; 0- to 100-point scale) (see Analysis 8.1).

Comparison 9: open surgery by transverse incision of the skin in the distal palmar crease versus open surgery by transverse incision of the skin about 2-3 mm distally from distal palmar crease

Only one study compared open surgery by transverse incision of the skin in the distal palmar crease versus open surgery by transverse incision of the skin about 2-3 mm distally from distal palmar crease (Kloeters 2016).

Kloeters 2016 assessed data on function or disability of the hand by DASH score. No data regarding resolution of trigger finger, pain, patient satisfaction, recurrence, adverse events or neurovascular injury were assessed in the trial.

The DASH scores and respective standard error of the mean at preoperative baseline, and at one, three and 12 months follow-up were reported in Kloeters 2016. The analyzes of the results showed that although the baseline preoperative values of the DASH score were significantly lower in the open surgery group by transverse incision of the skin about 2-3 mm distally from distal palmar crease, no significant difference between the groups was observed at one (MD 6.70, 95% CI −13.67 to 27.07; 0- to 100-point scale), three (MD 3.60, 95% CI −12.84 to 20.04; 0- to 100-point scale) and 12 months follow-up (MD 12.00, 95% CI −8.84 to 32.84; 0- to 100-point scale) (see Analysis 9.1).

Sensitivity analyses

Three quasi-randomised trials were considered at high risk of selection bias (Aref 2014; Dierks 2008; Singh 2005). Five randomised trials were considered at unclear allocation concealment (Bamroongshawgasame 2010; Callegari 2011; Kloeters 2016; Maneerit 2003; Pegoli 2008). We were unable to perform the sensitivity analyses in Comparisons 3, 4, 6, 7, 8 and 9, since they corresponded to only one trial. In Comparison 1 (open surgery versus steroid injection) all studies (Hansen 2017; Sato 2012) were low risk of selection bias, and no change in the analyses was observed for all the outcomes analysed (resolution, pain, frequency of recurrence, adverse events and neurovascular injury) (see Analysis 1.1; Analysis 1.2; Analysis 1.3; Analysis 1.4; Analysis 1.5; Analysis 1.6). When we removed the studies with high or uncertain risk of bias in Comparison 2 (percutaneous surgery versus steroid injection) there was no change in the analyses for the outcomes of resolution, pain or neurovascular injury (see Analysis 2.1; Analysis 2.2; Analysis 2.3; Analysis 2.6). In the analysis of the recurrence outcome we observed that in the final assessment of follow-up (six to 12 months) there were no significant differences between the two groups either in the analysis of all trials (RR 0.57, 95% CI 0.21 to 1.59), or in the analysis after removing Aref 2014 and Singh 2005 (RR 0.23, 95% CI 0.03 to 2.08) (see Analysis 2.4). We only found a change in the recurrence results in the long-term subgroup (more than six months), which had initially shown no difference between groups (RR 0.55, 95% CI 0.10 to 2.99) and was then favourable to the percutaneous surgery group (RR 0.09, 95% CI 0.01 to 0.66), after removing the studies Aref 2014 and Singh 2005 (see Analysis 2.8.3). When we analysed the outcome of adverse events there were no result changes, which remained with no significant difference between groups, both in the analysis for total adverse events with all studies (RR 1.58, 95% CI 0.91 to 2.75), or after removing the studies Aref 2014 and Singh 2005 (RR 1.14, 95% CI 0.25 to 5.14) (see Analysis 2.5). In Comparison 5 (percutaneous surgery versus open surgery) the data analyses with all studies were similar to the analyses after the removal of studies with high or uncertain risk of bias (Bamroongshawgasame 2010; Dierks 2008), which remained with no differences between the comparison groups for all the outcomes analysed (resolution, pain, frequency of recurrence and adverse events) (see Analysis 5.1; Analysis 5.2; Analysis 5.3; Analysis 5.4; Analysis 5.5). The

resolution at the end of treatment (two- to six-months' follow-up) with all studies included (RR 1.00, 95% CI 0.97 to 1.02) remained with no difference between groups after removing the studies Bamroongshawgasame 2010 and Dierks 2008 (RR 1.00, 95% CI 0.97 to 1.04) (see Analysis 5.1); the same outcome was observed for adverse events, which remained with no significant difference between groups in the analysis with all studies included (RR 0.80, 95% CI 0.17 to 3.68) and after removing the two studies (Bamroongshawgasame 2010; Dierks 2008) (RR 0.57, 95% CI 0.10 to 3.25) (see Analysis 5.5). The pain outcome was assessed by only one study and the outcome frequency of recurrence did not change (see Analysis 5.2; Analysis 5.3; Analysis 5.4).

We also investigated the effect of imputation of incomplete outcome data on the results. In Comparison 1 the outcome resolution continued with no significant differences between the two groups when the results between open surgery versus steroid injection were compared at the end of follow-up (six to 12 months) for the best-case scenario (RR 1.48, 95% CI 0.82 to 2.68) and for the worst-case scenario (RR 1.48, 95% CI 0.79 to 2.76). No data loss was observed in the analyses of the incidence of pain on the palm of the hand. Hansen 2017 reported data about severity of pain and provided the median and the IQR, but they did not report the mean and standard deviation; the sensitivity analysis for data loss showed no change in the outcome for pain (1 to 10 scale), which remained with no significant difference between groups in a short follow-up time (three months) as well as when we considered the results based on the median and IQR reported in Hansen 2017 (open surgery group: median 1, IQR 1 to 2; steroid injection group: mean 1, IQR 1 to 1; $P > 0.05$), as in the analyses of results using an approximate mean and an approximate SD (MD 0.00, 95% CI −0.23 to 0.23); there was no change in the results in the long term follow-up (12 months), which remained favorable to the open surgery group as well as when we considered the results based on the median and IQR reported in Hansen 2017 (open surgery group: median 1, IQR 1 to 1; steroid injection group: mean 3, IQR 1 to 5; $P < 0.05$), as in the analyses of results that showed approximate mean and SD (MD -2.00, 95% CI −2.68 to -1.32). There was no change in the results for the outcome recurrence at endpoint (six to 12 months) which remained favourable to open surgery group in the worst-case scenario (RR 0.17, 95% CI 0.09 to 0.33), and in the best-case scenario (RR 0.03, 95% CI 0.00 to 0.19). There were no changes in the results of total adverse events, which remained unchanged between treatment groups at both the worst (RR 1.02, 95% CI 0.57 to 1.84) and best-case scenario (RR 0.74, 95% CI 0.34 to 1.60). There were also no changes in the outcome results of neurovascular injury, which remained unchanged between groups in both the worst-case scenario (RR 2.17, 95% CI 0.70 to 6.77), and best-case scenario (RR 2.89, 95% CI 0.12 to 70.03). In Comparison 2 the outcome resolution continued with no significant differences between the two groups when the results between percutaneous surgery versus steroid injection were compared at the end of follow-up (six months to one year) for the best-case scenario (RR 1.91, 95% CI 0.42 to 8.63) and for the worst-case scenario (RR 2.11, 95% CI 0.31 to 14.51). We observed a change in the pain outcome (VAS) in which the analysis with all studies included showed no difference between the two groups in the short term (MD −1.80, 95% CI −5.72 to 2.12), while after removing one study - Zyluk 2011 - that did not report the standard deviation, we observed that the result was then favourable to the percutaneous surgery group (MD −3.80, 95% CI −4.34 to −3.26). There was no change in the results for the outcome recurrence at endpoint (six to 12 months) which continued with no difference between the two groups in the worst-case scenario (RR 0.57, 95% CI 0.21 to 1.59), and in the best-case scenario (RR 0.30, 95% CI 0.07 to 1.39). The results also did not change for the outcome adverse events, which continued with no difference between the two groups in the worst-case scenario (RR 1.58, 95% CI 0.91 to 2.75), and in the best-case scenario (RR 1.43, 95% CI 0.68 to 2.99). Comparison 3 (open surgery versus steroid injection plus ultrasound-guided hyaluronic acid injection) consisted of only one study, which assessed the outcomes pain (VAS), functional status of the hand (DASH) and patient satisfaction but did not report the standard deviations, and therefore the data could not be assessed (Callegari 2011). The sensitivity analysis for data loss in Comparison 4 (percutaneous surgery plus steroid injection versus steroid injection) showed no difference in the outcome resolution of symptoms after one or more injections, which remained favourable to treatment with percutaneous surgery in the worst-case scenario (RR 1.51, 95% CI 1.21 to 1.90) and in the best-case scenario (RR 1.50, 95% CI 1.21 to 1.86). There was also no change in total adverse events, which remained with no significant difference between groups in the worst-case scenario (RR 0.92, 95% CI 0.13 to 6.36), and in the best-case scenario (RR 0.92, 95% CI 0.06 to 14.46). The analysis of Comparison 5 (percutaneous surgery versus open surgery) showed data loss for the assessment of pain and patient satisfaction in the study of Bamroongshawgasame 2010, which reported these outcomes only through figures, with inaccurate values and without standard deviation data. Comparisons 6, 7, 8 and 9 had no data loss.

ADDITIONAL SUMMARY OF FINDINGS [*Explanation*]

Percutaneous surgery versus steroid injection for treating trigger finger

Patient or population: patients with trigger finger
Settings: hospital
Intervention: percutaneous surgery
Comparison: steroid injection

Outcomes	Illustrative comparative risks* (95% CI)		Relative effect (95% CI)	No of Participants (studies)	Quality of the evidence (GRADE)	Comments
	Assumed risk	Corresponding risk				
	Steroid injection	Percutaneous surgery				
Resolution of symptoms (after 1 or more injections) Follow-up: range 6 to 12 months	545 per 1000	1000 per 1000 (169 to 1000)	RR 2.11 (0.31 to 14.51)	191 (2 RCTs)	⊕◯◯◯ VERY LOW [1,2,3]	Absolute difference: 42% more had resolution of symptoms with percutaneous surgery (15% fewer to 98% more); relative change: 111% more (69% fewer to 1351% more) NNTB n/a[4]
Pain (Visual analogue scale: 0 to 10 points) Follow-up: 1 month	The mean pain in the control group was 2.7	The mean pain in the intervention group was 1.8 lower (5.72 lower to 2.12 higher)		222 (2 RCTs)	⊕◯◯◯ VERY LOW [1,2,3]	Absolute reduction: 18% pain reduction with percutaneous surgery (57% reduction to 21% increase), and the relative percent change translates to improvement of 25% (29% worse to 78% better)[5]. NNTB n/a[4] Although a decrease of

						1.8 in the VAS score (VAS: 0 to 10 points; where 0 mean no pain and 10 severe pain) may correspond to clinical improvement, there was no statistical difference between the groups and some participants' pain worsened)
Function Not measured	See comment	See comment		-	See comment	Not measured in any trial.
Participant global assessment of success Not measured	See comment	See comment		-	See comment	Not measured in any trial.
Recurrence Follow-up: range 6 to 12 months	197 per 1000	112 per 1000 (41 to 313)	RR 0.57 (0.21 to 1.59)	392 (5 RCTs)	⊕◯◯◯ VERY LOW [2,3,6]	Absolute risk difference: 9% fewer people had recurrence with percutaneous surgery (19%fewer to 2%more) , and the relative percent change translates to improvement of 43% (59%worse to 79%better). The NNTB n/a[4].
Adverse events (infection, partial loss of movement, tendon or –0 injury, dysaesthesia, and skin atrophy or hypopigmentation) Follow-up: range 6 to 12 months	89 per 1000	140 per 1000 (81 to 244)	RR 1.58 (0.91 to 2.75)	392 (5 RCTs)	⊕◯◯◯ VERY LOW [3,6]	Absolute risk difference: 3%more people had adverse events with percutaneous surgery (5% fewer to 11% more), and the relative percent

						change translates to worsening of 58% (9% better to 175% worse). The NNTH n/a[4].
Neurovascular injury Follow-up: range 6 to 12 months	30 per 1000	11 per 1000 (1 to 100)	RR 0.35 (0.04 to 3.29)	191 (2 RCTs)	⊕⊕◯◯ LOW [1,3]	Absolute difference: fewer than 1% had neurovascular injury with percutaneous surgery (5% fewer to 3% more) ; relative change: 65% fewer (229% fewer to 96% more). The NNTB n/a[4].

*The basis for the **assumed risk** (e.g. the median control group risk across studies) is provided in footnotes. The **corresponding risk** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).
CI: Confidence interval;

GRADE Working Group grades of evidence
High quality: Further research is very unlikely to change our confidence in the estimate of effect.
Moderate quality: Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate.
Low quality: Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.
Very low quality: We are very uncertain about the estimate.

[1]The two trials had methodological flaws; they did not blind the outcome assessor, and they had selective reporting or unclear risk for incomplete outcome data.
[2]Inconsistency: heterogeneity was high.
[3]Imprecision: the total number of events was small, or the 95% confidence interval includes both percutaneous surgery and steroid injection groups, or the 95% confidence interval includes both no clinical effect, and "appreciable benefit" in favour of the steroid injection group.
[4]Number needed to treat for an additional beneficial outcome (NNTB), or for an additional harmful outcome (NNTH) not applicable (n/a) when result is not statistically significant. NNT for dichotomous outcomes calculated using Cates NNT calculator (www.nntonline.net/visualrx/). NNT for continuous outcomes calculated using Wells Calculator (CMSG editorial office).
[5]Basis for assumed risk was the mean baseline risk from the studies in the meta-analysis.

[6]The five trials had methodological flaws; two were quasi-randomised; four did not blind the outcome assessor and three had unclear risk for incomplete outcome data (one trial had follow-up loss 17%, but 'intention to treat analysis' was not done; two trials did not report the follow-up loss); four trials had selective reporting. We opted by double downgrade.

Open surgery versus steroid injection plus hyaluronic acid injection guided by ultrasound for treating trigger finger

Patient or population: patients with trigger finger
Settings: hospital
Intervention: open surgery
Comparison: steroid injection plus hyaluronic acid injection guided by ultrasound

Outcomes	Illustrative comparative risks* (95% CI)		Relative effect (95% CI)	No of Participants (studies)	Quality of the evidence (GRADE)	Comments
	Assumed risk	Corresponding risk				
	Steroid injection plus hyaluronic acid injection guided by ultrasound	Open surgery				
Resolution of symptoms Follow up: 12 months	733 per 1000	990 per 1000 (719 to 1000)	RR 1.35 (0.98 to 1.85)	30 (1 RCT)	⊕◯◯◯ VERY LOW [1,2]	Absolute difference: 27% more had resolution of symptoms with open surgery (3% to 50% more); relative change: 35% more (2% fewer to 85% more). The NNTB n/a[3].
Pain (short-term) Not measured	See comment	See comment		-	See comment	Pain in 6-month follow-up was assessed by visual analogue scale (VAS: 0 to 10 points; where 0 means no pain and 10 severe pain), but the authors failed to report any measurement of variance: standard deviation, standard er-

					rors, P values, or confidence intervals. The VAS score was 1 point (range 0 to 2) in open surgery group, and 1 point (range 0 to 3) in steroid plus hyaluronic acid injection group. This is not clinically significant
Function Not measured	See comment	See comment	-	See comment	Functional status of the hand in follow-up of 6 months was assessed by DASH score, but the authors failed to report any measurement of variance. The DASH score was 11% (range 7 to 16) in open surgery group and 13% (range 7 to 20) in steroid plus hyaluronic acid injection group; it translates to absolute improvement of 2% (DASH score: 0 to 100%; where 0 means no disability and 100 the most severe disability) in the open surgery group. This is not a clinically significant difference

Participant global assessment of success Not measured	See comment	See comment		-	See comment	Patient satisfaction in follow-up was at 6 months assessed by satisfaction visual analogue scale (SVAS: 0 to 10 points; where 0 means totally unsatisfied and 10 completely satisfied), but the authors failed to report any measurement of variance: standard deviation, standard errors, P values, or confidence intervals. The SVAS score was 7.8 points (3 to 10 range) in the open surgery group, and 7.4 points (2 to 10 range) in steroid plus hyaluronic acid injection group; it translates to absolute improvement of 0.4 point in the open surgery group. This is not a clinically significant difference
Recurrence Follow-up: 12 months	200 per 1000	28 per 1000 (2 to 510)	RR 0.14 (0.01 to 2.55)	30 (1 RCT)	⊕◯◯◯ VERY LOW [1,2]	Absolute risk difference: 20% fewer people had recurrence with open surgery (42% fewer to 2% more), and the relative percent change translates to improvement of 86%

						(99% worse to 155% better). The NNTB n/a [3].
Adverse events (partial loss of movement, algodystrophic syndrome) Follow-up: 12 months	67 per 1000	200 per 1000 (23 to 1000)	RR 3.00 (0.35 to 25.68)	30 (1 RCT)	⊕◯◯◯ VERY LOW [1,2]	Absolute risk difference: 13% more people had adverse events with open surgery (11% fewer to 37% more), and the relative percent change translates to worsening of 200% (2468% worse to 65% better). The NNTH n/a [3].
Neurovascular injury Not measured	See comment	See comment	See comment	-	See comment	Not measured in any trial.

*The basis for the **assumed risk** (e.g. the median control group risk across studies) is provided in footnotes. The **corresponding risk** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).
CI: Confidence interval

GRADE Working Group grades of evidence
High quality: Further research is very unlikely to change our confidence in the estimate of effect.
Moderate quality: Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate.
Low quality: Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.
Very low quality: We are very uncertain about the estimate.

[1]The trial had methodological flaws; it did not describe how random sequence generation was created and whether allocation concealment was done; the outcome assessor was not blinded, and it had selective reporting. We opted by double downgrade.

[2]Imprecision: the total number of events was small, or the 95% confidence interval includes both no clinical effect, and "appreciable benefit" in favour of the open surgery group, or the 95% confidence interval includes both open surgery and steroid injection plus hyaluronic acid injection groups.

[3]Number needed to treat for an additional beneficial outcome (NNTB), or for an additional harmful outcome (NNTH) not applicable (n/a) when result is not statistically significant. NNT for dichotomous outcomes calculated using Cates NNT

calculator (www.nntonline.net/visualrx/). NNT for continuous outcomes calculated using Wells Calculator (CMSG editorial office).

Percutaneous surgery plus steroid injection versus steroid injection for treating trigger finger

Patient or population: patients with trigger finger
Settings: hospital
Intervention: percutaneous surgery plus steroid injection
Comparison: steroid injection

Outcomes	Illustrative comparative risks* (95% CI)		Relative effect (95% CI)	No of Participants (studies)	Quality of the evidence (GRADE)	Comments
	Assumed risk	Corresponding risk				
	Steroid injection	Percutaneous surgery plus steroid injection				
Resolution of symptoms (after 1 or more injections) Follow up: range 6 to 42 months	590 per 1000	891 per 1000 (714 to 1000)	RR 1.51 (1.21 to 1.90)	127 (1 RCT)	⊕◯◯◯ VERY LOW [1,2]	Absolute difference: 30% more had resolution of symptoms with percutaneous surgery plus steroid injection (16% to 45% more); relative change: 51% more (21% to 90% more). NNTB 4 (95% CI 3 to 6)
Pain (short-term) Not measured	See comment	See comment	See comment	-	See comment	Pain in follow-up of 2 weeks was assessed by visual analogue scale (VAS: 0 to 10 points; where 0 means no pain and 10 severe pain), but the authors failed to report any measurement of variance: standard deviation, standard errors, P values,

						or confidence intervals. The VAS score was 0.4 point in percutaneous surgery plus steroid injection group, and 0.3 point in steroid injection group; it translates to absolute worsening of 0.1 point in the percutaneous surgery plus steroid injection group. This is not a clinically significant difference
Function Not measured	See comment	See comment	See comment	-	See comment	Not measured in any trial.
Participant global assessment of success Not measured	See comment	See comment	See comment	-	See comment	Not measured in any trial.
Recurrence Not measured	See comment	See comment	See comment	-	See comment	Not measured in any trial.
Adverse events (infection, partial loss of movement) Follow-up: range 6 to 42 months	33 per 1000	30 per 1000 (4 to 209)	RR 0.92 (0.13 to 6.36)	127 (1 RCT)	⊕◯◯◯ VERY LOW [1,2]	Absolute risk difference: 0% (6% fewer to 6% more); relative percentage change: 8% fewer (536% fewer to 87% more). The NNTB n/a[3].
Neurovascular injury Follow-up: range 6 to 42 months	16 per 1000	15 per 1000 (1 to 237)	RR 0.92 (0.06 to 14.46)	127 (1 RCT)	⊕◯◯◯ VERY LOW [1,2]	Absolute risk difference: 0% (4% fewer to 4% more); relative percentage change: 8% fewer (1346% fewer to 94% more). The NNTB

				n/a[3].

*The basis for the **assumed risk** (e.g. the median control group risk across studies) is provided in footnotes. The **corresponding risk** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).
CI: Confidence interval;

GRADE Working Group grades of evidence
High quality: Further research is very unlikely to change our confidence in the estimate of effect.
Moderate quality: Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate.
Low quality: Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.
Very low quality: We are very uncertain about the estimate.

[1]The trial had methodological flaws; it did not describe how random sequence generation was created and whether allocation concealment was done; the outcome assessor was not blinded and it had selective reporting. We opted by double downgrade.

[2]Imprecision: the total number of events was small, or the 95% confidence interval includes both percutaneous surgery plus steroid injection, and steroid injection groups.

[3]Number needed to treat to benefit (NNTB), or harm (NNTH) not applicable (n/a) when result is not statistically significant. NNT for dichotomous outcomes calculated using Cates NNT calculator (http://www.nntonline.net/visualrx/). NNT for continuous outcomes calculated using Wells Calculator (CMSG editorial office).

Percutaneous surgery versus open surgery for treating trigger finger

Patient or population: patients with trigger finger
Settings: hospital
Intervention: percutaneous surgery
Comparison: open surgery

Outcomes	Illustrative comparative risks* (95% CI)		Relative effect (95% CI)	No of Participants (studies)	Quality of the evidence (GRADE)	Comments
	Assumed risk	Corresponding risk				
	Open surgery	Percutaneous surgery				
Resolution of symptoms Follow-up: range 2 to 6 months	995 per 1000	995 per 1000 (965 to 1000)	RR 1.00 (0.97 to 1.02)	429 (5 RCTs)	⊕⊕◯◯ LOW [1]	Absolute risk difference: 0% (3% fewer to 2% more); relative percentage change: 0% (3% fewer to 2% more). NNTB n/a[2].
Pain (1 to 6 scale) Follow-up: 1 week	The mean pain short term (1 to 6 scale) in the control group was 2.5	The mean pain short term (1 to 6 scale) in the intervention group was 0.3 higher (0.34 lower to 0.94 higher)	-	36 (1 RCT)	⊕◯◯◯ VERY LOW [3,4]	Absolute risk difference: 6% increase in pain with percutaneous surgery (7% reduction to 19% increase), and the relative percent change translates to worsening of 7% (22% worse to 8% better)[5]. NNTH n/a[2]. The difference of 0.3 points in the pain score (pain score: 1 to 6 points; where 1 means no pain and 6 extreme

						pain) is not clinically significant
Function Not measured	See comment	See comment	See comment	-	See comment	Not measured in any trial.
Participant global assessment of success Not measured	See comment	See comment	See comment	-	See comment	Not measured in any trial.
Recurrence Follow-up: range 2 to 6 months	5 per 1000	1 per 1000 (0 to 34)	RR 0.28 (0.01 to 6.83)	397 (4 RCTs)	⊕⊕◯◯ VERY LOW [4,6]	Absolute risk difference: 0% (2% fewer to 2% more); relative percentage change: 72% fewer (583% fewer to 99% more). The NNTB n/a[2].
Adverse events (infection, partial loss of movement, tendon or pulley injury, oedema or inflammation or hematoma, adherence) Follow-up: range 2 to 6 months	14 per 1000	11 per 1000 (2 to 52)	RR 0.80 (0.17 to 3.68)	429 (5 RCTs)	⊕◯◯◯ VERY LOW [1,4]	Absolute risk difference: 0% (2% fewer to 2% more); relative percentage change: 20% fewer (268% fewer to 83% more). The NNTB n/a[2].
Neurovascular injury Follow-up: range 2 to 6 months	0 per 1000	0 per 1000 (0 to 0)	Could not be estimated	397 (4 RCTs)	⊕◯◯◯ VERY LOW [4,6]	There was no injury in both groups.

*The basis for the **assumed risk** (e.g. the median control group risk across studies) is provided in footnotes. The **corresponding risk** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).
CI: Confidence interval;

GRADE Working Group grades of evidence
High quality: Further research is very unlikely to change our confidence in the estimate of effect.
Moderate quality: Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate.
Low quality: Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.
Very low quality: We are very uncertain about the estimate.

[1]All five trials had methodological flaws; one was quasi-randomised; three had adequate concealed treatment allocation, and one did not describe how this allocation concealment was done; the subjective outcomes assessor was blinded in one, and no trial blinded the objective outcomes assessor; selective reporting was observed in three trials. We choe to double downgrade.

[2]Number needed to treat to benefit (NNTB), or harm (NNTH) not applicable (n/a) when result is not statistically significant. NNT for dichotomous outcomes calculated using Cates NNT calculator (www.nntonline.net/visualrx/). NNT for continuous outcomes calculated using Wells Calculator (CMSG editorial office).

[3]This quasi-randomised trial had bias in the random sequence generation and allocation concealment; the outcome assessor was not blinded, and it had selective reporting. We opted by double downgrade.

[4]Imprecision: the total number of events was small, or the 95% confidence interval includes both no clinical effect and "appreciable benefit" in favour of the open surgery group, or the 95% confidence interval includes both percutaneous and open surgery.

[5]Basis for assumed risk was the mean baseline risk from the study in the meta-analysis.

[6] The four trials had methodological flaws; one was quasi-randomised; only two had adequate concealed treatment allocation, and one did not describe how this allocation concealment was done; the outcome assessor was not blinded and three had selective reporting in the trial. We opted by double downgrade.

Endoscopic surgery versus open surgery for treating trigger finger

Patient or population: patients with trigger finger
Settings: hospital
Intervention: endoscopic surgery
Comparison: open surgery

Outcomes	Illustrative comparative risks* (95% CI)		Relative effect (95% CI)	No of Participants (studies)	Quality of the evidence (GRADE)	Comments
	Assumed risk	Corresponding risk				
	Open surgery	Endoscopic surgery				
Resolution of symptoms Follow-up: 3 months	1000 per 1000	1000 per 1000 (980 to 1000)	RR 1.00 (0.98 to 1.02)	231 (1 RCT)	⊕◯◯◯ VERY LOW [1,2]	Absolute risk difference: 0% (2% fewer to 2% more); relative percentage change: 0% (2% fewer to 2% more). The NNTB n/a[3].
Pain (short-term) Not measured	See comment	See comment	See comment	-	See comment	Not measured in any trial.
Function Not measured	See comment	See comment	See comment	-	See comment	Not measured in any trial.
Participant global assessment of success Not measured	See comment	See comment	See comment	-	See comment	Not measured in any trial.
Recurrence Not measured	See comment	See comment	See comment	-	See comment	Not measured in any trial.

Adverse events (infection, dysaesthesia) Follow-up: 3 months	26 per 1000	70 per 1000 (19 to 258)	RR 2.74 (0.74 to 10.06)	231 (1 RCT)	⊕◯◯◯ VERY LOW [1,2]	Absolute risk difference: 4% more people had adverse events with endoscopic surgery (1% fewer to 10% more), and the relative percent change translates to worsening of 174% (906% worse to 26% better). The NNTH n/a[3].
Neurovascular injury Follow-up: 3 months	0 per 1000	0 per 1000 (0 to 0)	RR 3.08 (0.13 to 74.79)	231 (1 RCT)	⊕◯◯◯ VERY LOW [1,2]	Absolute difference: 1% more had neurovascular injury with endoscopic surgery (2% fewer to 3% more); relative change: 208% more (87% fewer to 7379% more). The NNTH n/a[3].

*The basis for the **assumed risk** (e.g. the median control group risk across studies) is provided in footnotes. The **corresponding risk** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).
CI: Confidence interval;

GRADE Working Group grades of evidence
High quality: Further research is very unlikely to change our confidence in the estimate of effect.
Moderate quality: Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate.
Low quality: Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.
Very low quality: We are very uncertain about the estimate.

[1]The trial had methodological flaws; the authors did not describe how randomisation sequence was created and whether allocation concealment was done; the outcome assessor was not blinded and the trial had selective reporting. We chose to double downgrade.
[2]Imprecision: the total number of events was small, or the 95% confidence interval includes both open surgery and endoscopic surgery groups.
[3]Number needed to treat for an additional beneficial outcome (NNTB), or for an additional harmful outcome (NNTH) not applicable (n/a) when result is not statistically significant. NNT for dichotomous outcomes calculated using Cates NNT

calculator (www.nntonline.net/visualrx/). NNT for continuous outcomes calculated using Wells Calculator (CMSG editorial office).

Open surgery by transverse incision of the skin about 2-3 mm distally from distal palmar crease compared to open surgery by longitudinal incision of the skin for trigger finger

Patient or population: patients with trigger finger
Setting: hospital
Intervention: open surgery by transverse incision of the skin about 2-3 mm distally from distal palmar crease
Comparison: open surgery by longitudinal incision of the skin

Outcomes	Illustrative comparative risks* (95% CI)		Relative effect (95% CI)	№ of participants (studies)	Quality of the evidence (GRADE)	Comments
	Assumed risk	Corresponding risk				
	Open surgery by longitudinal incision of the skin	Open surgery by transverse incision of the skin about 2-3 mm distally from distal palmar crease				
Resolution of symptoms Not measured	See comment	See comment		-	See comment	Not measured in any trial.
Pain (short-term) Not measured	See comment	See comment		-	See comment	Not measured in any trial.
Function (DASH score: 0 to 100 points) Follow-up: 12 months	The mean DASH score in the control group was 15.3	The mean DASH score in the intervention group was 8.9 lower (23.35 lower to 5.55 higher)	-	21 (1 RCT)	⊕◯◯◯ VERY LOW [1,2]	Absolute risk difference: 8.9% increase in hand function with open surgery by transverse incision of the skin about 2-3 mm distally from the distal palmar crease (23.35% increase to 5.55% re-

					duction), and the relative percentage change translates to improvement of 21.7% (13.54% worse to 56.95% better) [3]. NNTH n/a[4]. The difference of 8.9 points in the DASH score (DASH: 0 to 100 points; where 0 means no disability and 100 means the most severe disability) is not clinically significant
Participant global assessment of success Not measured	See comment	See comment	-	See comment	Not measured in any trial.
Recurrence Not measured	See comment	See comment	-	See comment	Not measured in any trial.
Adverse events Not measured	See comment	See comment	-	See comment	Not measured in any trial.
Neurovascular injury Not measured	See comment	See comment	-	See comment	Not measured in any trial.

*__The risk in the intervention group__ (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).

CI: Confidence interval; **RR:** Risk ratio; **OR:** Odds ratio;

GRADE Working Group grades of evidence
High quality: We are very confident that the true effect lies close to that of the estimate of the effect
Moderate quality: We are moderately confident in the effect estimate: The true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different
Low quality: Our confidence in the effect estimate is limited: The true effect may be substantially different from the estimate of the effect

Very low quality: We have very little confidence in the effect estimate: The true effect is likely to be substantially different from the estimate of effect

[1] The trial had methodological flaws; the authors did not describe how randomisation sequence was created and whether allocation concealment was done; the outcome assessor was not blinded and the trial had selective reporting. We opted by double downgrade.

[2] Imprecision: the total number of events was small, or the 95% confidence interval includes both groups (transverse incision of the skin about 2-3 mm distally from distal palmar crease and longitudinal incision of the skin).

[3]Basis for assumed risk was the mean baseline risk from the study in the meta-analysis.

[4]Number needed to treat to benefit (NNTB), or harm (NNTH) not applicable (n/a) when result is not statistically significant. NNT for dichotomous outcomes calculated using Cates NNT calculator (www.nntonline.net/visualrx/). NNT for continuous outcomes calculated using Wells Calculator (CMSG editorial office).

Open surgery by transverse incision of the skin in the distal palmar crease compared to open surgery by longitudinal incision of the skin for trigger finger

Patient or population: patients with trigger finger
Setting: hospital
Intervention: open surgery by transverse incision of the skin in the distal palmar crease
Comparison: open surgery by longitudinal incision of the skin

Outcomes	Illustrative comparative risks* (95% CI)		Relative effect (95% CI)	№ of participants (studies)	Quality of the evidence (GRADE)	Comments
	Assumed risk	Corresponding risk				
	Open surgery by longitudinal incision of the skin	Open surgery by transverse incision of the skin in the distal palmar crease				
Resolution of symptoms Not measured	See comment	See comment		-	See comment	Not measured in any trial.
Pain (short-term) Not measured	See comment	See comment		-	See comment	Not measured in any trial.
Function (DASH score: 0 to 100 points) Follow-up: 12 months	The mean DASH score in the control group was 15.3	The mean DASH score in the intervention group was 3.1 higher (21.28 lower to 27.48 higher)	-	22 (1 RCT)	⊕◯◯◯ VERY LOW [1,2]	Absolute reduction: 3.1% function reduction with open surgery by transverse incision of the skin in the distal palmar crease (27.48% reduction to 21.28% increase), and the relative percent change translates to worsening of 7.56% (67.02% worse to

						51.9% better)[3]. NNTB n/a[4]. The difference of 3.1 points in the DASH score (DASH: 0 to 100 points; where 0 means no disability and 100 means the most severe disability) is not clinically significant
Participant global assessment of success Not measured	See comment	See comment	Not estimable	-	See comment	Not measured in any trial.
Recurrence Not measured	See comment	See comment	Not estimable	-	See comment	Not measured in any trial.
Adverse events Not measured	See comment	See comment	Not estimable	-	See comment	Not measured in any trial.
Neurovascular injury Not measured	See comment	See comment	Not estimable	-	See comment	Not measured in any trial.

*__The risk in the intervention group__ (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).

CI: Confidence interval; **RR:** Risk ratio; **OR:** Odds ratio;

GRADE Working Group grades of evidence
High quality: We are very confident that the true effect lies close to that of the estimate of the effect
Moderate quality: We are moderately confident in the effect estimate: The true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different
Low quality: Our confidence in the effect estimate is limited: The true effect may be substantially different from the estimate of the effect
Very low quality: We have very little confidence in the effect estimate: The true effect is likely to be substantially different from the estimate of effect

[1] The trial had methodological flaws; the authors did not describe how randomisation sequence was created and whether allocation concealment was done; the outcome assessor was not blinded and the trial had selective reporting. We chose to double downgrade.

[2] Imprecision: the total number of events was small, or the 95% confidence interval includes both groups (transverse incision of the skin in the distal palmar crease and longitudinal incision of the skin).

[3]Basis for assumed risk was the mean baseline risk from the study in the meta-analysis.

[4]Number needed to treat to benefit (NNTB), or harm (NNTH) not applicable (n/a) when result is not statistically significant. NNT for dichotomous outcomes calculated using Cates NNT calculator (www.nntonline.net/visualrx/). NNT for continuous outcomes calculated using Wells Calculator (CMSG editorial office).

Open surgery by transverse incision of the skin in the distal palmar crease compared to open surgery by transverse incision of the skin about 2-3 mm distally from distal palmar crease for trigger finger

Patient or population: patients with trigger finger
Setting: hospital
Intervention: open surgery by transverse incision of the skin in the distal palmar crease
Comparison: open surgery by transverse incision of the skin about 2-3 mm distally from distal palmar crease

Outcomes	Illustrative comparative risks* (95% CI)		Relative effect (95% CI)	№ of participants (studies)	Quality of the evidence (GRADE)	Comments
	Assumed risk	Corresponding risk				
	Open surgery by transverse incision of the skin about 2-3 mm distally from distal palmar crease	Open surgery by transverse incision of the skin in the distal palmar crease				
Resolution of symptoms Not measured	See comment	See comment		-	See comment	Not measured in any trial.
Pain (short-term) Not measured	See comment	See comment		-	See comment	Not measured in any trial.
Function (DASH score: 0 to 100 points) Follow-up: 12 months	The mean DASH score in the control group was 6.4	The mean DASH score in the intervention group was 12 higher (8.84 lower to 32.84 higher)	-	21 (1 RCT)	⊕◯◯◯ VERY LOW [1,2]	Absolute risk difference: 12% decrease in function with open surgery by transverse incision of the skin in the distal palmar crease (32.84% reduction to 8.84% increase), and the rela-

					tive percentage change translates to worsening of 61.22% (167.55% worse to 45.1% better) [3]. NNTH n/a[4]. Although an increase of 12 in the DASH score (DASH: 0 to 100 points; where 0 means no disability and 100 means the most severe disability) may correspond to clinical worsening, there was no statistical difference between the groups and some participants' hand function improved)
Participant global assessment of success Not measured	See comment	See comment	-	See comment	Not measured in any trial.
Recurrence Not measured	See comment	See comment	-	See comment	Not measured in any trial.
Adverse events Not measured	See comment	See comment	-	See comment	Not measured in any trial.
Neurovascular injury Not measured	See comment	See comment	-	See comment	Not measured in any trial.

*__The risk in the intervention group__ (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).

CI: Confidence interval; **RR:** Risk ratio; **OR:** Odds ratio;

GRADE Working Group grades of evidence
High quality: We are very confident that the true effect lies close to that of the estimate of the effect
Moderate quality: We are moderately confident in the effect estimate: The true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different
Low quality: Our confidence in the effect estimate is limited: The true effect may be substantially different from the estimate of the effect
Very low quality: We have very little confidence in the effect estimate: The true effect is likely to be substantially different from the estimate of effect

[1] The trial had methodological flaws; the authors did not describe how randomisation sequence was created and whether allocation concealment was done; the outcome assessor was not blinded and the trial had selective reporting. We chose to double downgrade.

[2] Imprecision: the total number of events was small, or the 95% confidence interval includes both groups (transverse incision of the skin in the distal palmar crease and transverse incision of the skin about 2-3 mm distally from distal palmar crease).

[3]Basis for assumed risk was the mean baseline risk from the study in the meta-analysis.

[4]Number needed to treat to benefit (NNTB), or harm (NNTH) not applicable (n/a) when result is not statistically significant. NNT for dichotomous outcomes calculated using Cates NNT calculator (www.nntonline.net/visualrx/). NNT for continuous outcomes calculated using Wells Calculator (CMSG editorial office).

DISCUSSION

Summary of main results

We included 14 single-centre trials (eleven randomised and three quasi-randomised), involving 1361 fingers in 1260 participants, which compared, with each other or with any other medical treatment, the effectiveness of different surgical techniques for the treatment of trigger finger. These 14 studies allowed nine comparisons: open surgery versus steroid injection (two trials), in which one of the studies used ultrasound to guide the application of corticosteroids, while the other made the injections without using ultrasound; percutaneous surgery versus steroid injection (five trials); open surgery versus steroid injection plus ultrasound-guided hyaluronic acid injection (one trial); percutaneous surgery plus steroid injection versus steroid injection (one trial); percutaneous surgery versus open surgery (five trials), in which one of the studies used ultrasound to guide the percutaneous surgery, while the other four performed the procedure without using ultrasound; endoscopic surgery versus open surgery (one trial); open surgery by transverse incision of the skin about 2-3 mm distally from distal palmar crease versus open surgery by longitudinal incision of the skin at the level of the A1-pulley without crossing the proximal distal palmar crease (one trial); open surgery by transverse incision of the skin in the distal palmar crease versus open surgery by longitudinal incision of the skin at the level of the A1-pulley without the proximal crossing the distal palmar crease (one trial); and open surgery by transverse incision of the skin in the distal palmar crease versus open surgery by transverse incision of the skin about 2-3 mm distally from the distal palmar crease (one trial).

There are three ongoing studies (see Ongoing studies): NTR1135 compares open surgery versus steroid injection and they were recruiting participants at the time of writing this review; TCTR20140529001 compares percutaneous surgery with needle versus percutaneous surgery with probe scalpel and recruitment had not started; and TCTR20150416001 compares open surgery versus percutaneous surgery and recruitment had started at the time of writing this review.

In our global analysis comparing the different types of surgical treatment for trigger finger, we present the results divided into nine groups according to the type of comparison performed. When possible, we present the results divided into subgroups according to the elapsed time (short-, intermediate- and long-term); it was not possible to sub-group the results according to the participants' age or according to the presence or absence of comorbidities due to lack of data in the included studies.

We did not assess all of the evidence for all outcomes we considered as important in all of the possible comparisons, due to the lack of reporting of relevant outcomes in the studies; we could not carry out analysis for the outcome 'patient satisfaction'.

In Comparison 1, the very low quality evidence leaves us uncertain if open surgery results in improvement in the resolution of triggering when compared with one or more steroid application (see Summary of findings for the main comparison). Low quality evidence indicates that open surgery may decrease triggering recurrence, although it may more painful. We are uncertain if there were any differences between treatments for adverse events and neurovascular injury due to the low number of events (see Summary of findings for the main comparison). No studies measured hand function or patient satisfaction. We downgraded evidence due to risk of detection bias, imprecision and, for the outcome 'resolution', high heterogeneity too (see Summary of findings for the main comparison).

In Comparison 2, the very low quality evidence leaves us uncertain if when compared with steroid application, percutaneous surgery results in improvement in the resolution of triggering, pain relief in the short term, increases adverse events or reduces recurrence rates (see Summary of findings 2). Low quality evidence indicates we are also uncertain if there was any difference in the risk of neurovascular injury, due to the low number of events. No trials measured hand function or patient satisfaction. We downgraded evidence due to risk of bias, imprecision and, for some outcomes, high heterogeneity (see Summary of findings 2).

The very low quality of evidence in Comparison 3 indicates we are uncertain if there is any difference in the resolution of triggering, recurrence or adverse events between open surgery treatment and steroid injection plus ultrasound-guided hyaluronic acid injection (see Summary of findings 3). Reporting bias due to partial publication made it impossible to analyze the data regarding pain relief, functional improvement of the hand or patient satisfaction, because the authors failed to report any measurement of variance (standard deviation, standard errors, P values, or confidence intervals). We were unable to assess if the surgical treatment had a greater risk of neurovascular injury as the study did not report this outcome. We downgraded evidence due to risk of bias (double downgrade) and imprecision (see Summary of findings 3).

In Comparison 4, the very low quality of evidence of the study indicates that we are uncertain if percutaneous surgery plus steroid injection improves resolution of triggering, results in more adverse events or an increased risk of neurovascular injury when compared with steroid injection (see Summary of findings 4). Reporting bias due to partial publication made it impossible to analyze the data regarding pain relief, because the authors failed to report any measurement of variance (standard deviation, standard errors, P values, or confidence intervals). The study did not report functional measures, recurrence of triggering or patient satisfaction. We downgraded evidence due to risk of bias (double downgrade) and imprecision (see Summary of findings 4).

The very low to low quality of evidence in the studies in Comparison 5 indicates that we are uncertain if percutaneous surgery resolves triggering, improves pain, reduces recurrence, increases adverse events, or the risk of neurovascular injury when compared to open surgery (see Summary of findings 5). Hand function and patient satisfaction were not reported in the studies. We down-

graded evidence due to risk of bias (double downgrade) and, for some outcomes, imprecision (see Summary of findings 5).

The very low quality of evidence in the studies in Comparison 6 indicates that we are uncertain if endoscopic surgery improves the resolution of triggering, decreases adverse events or the risk of neurovascular injury when compared to open surgery (see Summary of findings 6). Pain relief, functional hand improvement, recurrence of triggering and patient satisfaction were not reported. We downgraded evidence was downgraded due to risk of bias (double downgrade) and imprecision (see Summary of findings 6).

In Comparisons 7, 8 and 9, the very low quality of evidence analysis from a study comparing three different types of incision for open surgery treatment of the trigger finger indicated that it is uncertain if one of two types of transverse incision of the skin - on the distal palmar crease, or two to three millimeters distally from the distal palmar crease - improves hand function when compared to longitudinal incision of the skin, and also showed to be uncertain whether there is any difference in the function of the hand when the transverse incision of the skin in the distal palmar crease was compared with transverse incision of the skin about 2-3 mm distally from the distal palmar crease (see Summary of findings 7; Summary of findings 8; Summary of findings 9). The study did not report data on resolution, pain, patient satisfaction, recurrence of triggering, adverse events or neurovascular injury (see Summary of findings 7; Summary of findings 8; Summary of findings 9). We downgraded evidence due to risk of bias (double downgrade) and imprecision.

Overall completeness and applicability of evidence

The best recent evidence on surgery for trigger finger was obtained from eleven randomised trials and three quasi-randomised trials, which assessed only adult individuals with trigger finger (thumb or other fingers) at any stage of the disease, totalling 1361 events in 1260 participants. The effectiveness of different types of surgical treatment were compared and also compared with steroid infiltration, sub-grouping the results according to the follow-up time (short-, intermediate- and long-term). Studies in which ultrasound was used as a guide were analyzed in conjunction with studies in which the same procedure was performed without ultrasound visibility, provided that the comparison was between the same treatment methods (ex: open surgery versus ultrasound-guided steroid injection and open surgery versus steroid injection were analyzed in the same comparison). We were unable to sub-group the results according to the age of the participants or the presence of associated comorbidities, due to the lack of data in the included studies. No study reported all the important outcomes of the review: 10 trials reported the resolution of triggering and eight assessed pain, although one trial assessed pain dichotomously and five trials reported the data incompletely about pain. Three trials evaluated functional status of the hand by validated instruments, but only one reported complete data. No study reported complete data about patient satisfaction; 10 studies assessed triggering recurrence. Thirteen studies reported adverse events and eight trials reported full details of neurovascular injury.

A limitation of this review is that the resolution of triggering, considered as the main primary outcome, was defined differently in the 10 studies that reported it, which can interfere in the interpretation of the analyses of this outcome.

Quality of the evidence

In this review, the evidence was found to be of very low to low quality for the results grouped in the nine possible comparisons, and this was due to methodological flaws such as inadequate or uncertain allocation concealment in most studies and the lack of blinding of the outcomes assessed in 13 of 14 studies. Additionally, the trials included did not report data according to the CONSORT statement (Moher 2001), and only three studies (Hansen 2017; Nikolaou 2017; Sato 2012) published a protocol, but in Nikolaou 2017 and Sato 2012 it was dated after the study was finished.

In Comparison 1 (open surgery versus steroid injection), the evidence found was of very low quality for the outcome 'resolution', justified by one downgrade due to methodological flaws related to the risk of detection bias in the studies included in this comparison, one downgrade for imprecision due to the small number of events, and one downgrade for inconsistency because of high heterogeneity. As for the outcomes 'pain', 'trigger recurrence', 'adverse events' and 'neurovascular injury' we obtained low quality evidence, justified by a downgrade due to methodological flaws related to the risk of detection bias in the studies included in this comparison and a downgrade due to uncertainty related to the small number of events. The degree of evidence for the outcomes 'hand function' and 'participant satisfaction' was not assessed due to the lack of relevant data in the two studies included in this comparison.

Very low quality evidence was found in Comparison 2 (percutaneous surgery versus steroid injection) for the outcomes 'resolution', 'pain', 'trigger recurrence' and 'adverse events', and the results of the outcomes 'resolution' and 'pain' received one downgrade due to the methodological flaws of the studies related to detection bias and selective reporting, one downgrade for imprecision due to the small number of events, and one downgrade for inconsistency because of high heterogeneity; the outcomes 'trigger recurrence' and 'adverse events' received two downgrades due to significant methodological flaws related to bias selection (two trials were quasi-randomised), the presence of detection bias and selective reporting and one downgrade due to uncertainty related to the small number of events. It is also emphasized that the outcome 'trigger recurrence' also received a downgrade for inconsistency related to high heterogeneity. Low-quality evidence was obtained for the outcome 'neurovascular injury' which was downgraded due to the methodological flaws in the studies related to detection bias

and selective reporting, and downgraded for inaccuracy due to the small number of events. It was not possible to assess the degree of evidence for the outcomes 'hand function' and 'participant satisfaction' due to the lack of relevant data in the five studies included in this comparison.

In Comparison 3 (open surgery versus steroid injection plus hyaluronic acid injection guided by ultrasound) evidence of very low quality was found for the outcomes 'resolution', 'trigger recurrence' and 'adverse events', justified by a double downgrade due to significant methodological flaws of the study related to unclear selection bias, the presence of detection bias and selective reporting; a third downgrade was justified for uncertainty due to the small number of participants in this comparison. It was not possible to assess the degree of evidence for the outcomes 'pain', 'hand function', 'participant satisfaction' and 'neurovascular injury' due to the lack of relevant data in the only study included in this comparison.

Very low evidence was obtained in Comparison 4 (percutaneous surgery plus steroid injection versus steroid injection) for the outcomes 'resolution', 'adverse events' and 'neurovascular injury', due to a double downgrade for the methodological flaws of the studies related to unclear selection bias, detection bias and selective reporting, in addition to one downgrade for inconsistency due to the small number of events. It was not possible to assess the degree of evidence for the outcomes 'pain', 'hand function', 'participant satisfaction' and 'trigger recurrence' due to the lack of relevant data in the only study included in this comparison.

In the comparison between percutaneous surgery and open surgery (Comparison 5) we obtained low-quality evidence for the outcome 'resolution' due to a double downgrade for methodological flaws of the studies related to selection bias, detection bias and selective reporting. As for the outcomes 'pain', 'recurrence of trigger finger', 'adverse events' and 'neurovascular injury' we obtained very low quality evidence, justified by a double downgrade due to the methodological flaws of the studies related to selection bias, detection bias and selective reporting and one downgrade for imprecision related to the small number events in the studies of this comparison. It was not possible to assess the degree of evidence for the outcomes 'hand function' and 'participant satisfaction' due to the lack of relevant data in the four studies included in this comparison.

We found very low quality evidence in Comparison 6 (endoscopic surgery versus open surgery) for the outcomes 'resolution', 'adverse events' and 'neurovascular injury' due to a double downgrade for the methodological flaws of the only study in this comparison, related to lack of clarity regarding selection bias, and the presence of detection bias and selective reporting, and one downgrade for imprecision due to the small number of events in the study. It was not possible to assess the degree of evidence for the outcomes 'pain', 'hand function', 'participant satisfaction' and 'trigger recurrence' due to the lack of relevant data in the only study included in this comparison.

Very low-quality evidence was found in Comparisons 7 (open surgery by transverse incision of the skin about 2-3 mm distally from the distal palmar crease versus open surgery by longitudinal incision of the skin), 8 (open surgery by transverse incision of the skin in the distal palmar crease versus open surgery by longitudinal incision of the skin) and 9 (open surgery by transverse incision of the skin in the distal palmar crease versus open surgery by transverse incision of the skin about 2-3 mm distally from the distal palmar crease) for the outcome 'hand function' which was double downgraded due to the methodological flaws in the study related to selection bias, detection bias and selective reporting, and downgraded for inaccuracy due to the small number of events. It was not possible to assess the degree of evidence for the outcomes 'resolution', 'pain', 'participant satisfaction', 'trigger recurrence', 'adverse events' and 'neurovascular injury' due to the lack of relevant data in the only study included in these comparisons.

Potential biases in the review process

This review started with a systematic search for potential studies without any language restrictions, which included a manual search in conference proceedings and in published articles and review citations, as well as ongoing or recently completed research studies; however, it is possible that we have missed some relevant studies, but we underscore that we keep an open channel to contact the author (HFJ) for continuous updates.

We conducted direct e-mail communication with all the authors of the articles included in the review in order to try to obtain relevant omitted data; however we received feedback from only one of the authors (Sato 2012), who informed us about the exact number of the thumbs, index, long, ring and little fingers included in the study.

Whenever possible we followed the methods in our protocol. The changes are described in Differences between protocol and review.

Agreements and disagreements with other studies or reviews

We found some narrative reviews (Akhtar 2005; Fowler 2013; Health Information 2013; McAuliffe 2010; Ryzewicz 2006); and two systematic reviews which reported surgical treatment for trigger finger in adults (Huisstede 2010; Wang 2013). Huisstede 2010 included randomised or quasi-randomised clinical trials and one systematic review on steroid injections, while Wang 2013 included only randomised or quasi-randomised clinical trials. Although our results and conclusions are in partial agreement with these two reviews, our conclusions are more comprehensive and our methodology consistently differs from these and other reviews.

Huisstede 2010 assessed seven studies (a systematic review and six RCTs or quasi-RCTs) related to the subject of trigger finger and the data reported showed the outcomes 'pain', 'hand func-

tion' and 'recovery'; the systematic review and three RCTs only reported the comparisons related to treatment with infiltration (medication type, application site and number of applications). One study (Topper 1997) randomised the participants into three different types of surgery but changed all treatments during the procedure, performing the same surgery in all participants; thus, it was not characterized a randomised clinical trial (see Excluded studies). Two studies (Dierks 2008; Gilberts 2001), totalling 136 fingers, reported percutaneous surgery versus open surgery, but the authors did not perform quantitative analysis of the data in the review. Huisstede 2010 concludes that there is moderate evidence that steroid injection is effective in the short term (one to four weeks), but not effective in the long term, and that surgical treatment may be regarded as a definitive treatment choice, but there is still no evidence regarding which is the most effective method (percutaneous or open). However Huisstede 2010 based their findings on only two studies (Dierks 2008; Gilberts 2001), while we included five studies in the same comparison (percutaneous surgery versus open surgery) (Bamroongshawgasame 2010; Dierks 2008; Gilberts 2001; Nikolaou 2017; Sato 2012). The results of this review are in agreement with those published by Huisstede 2010, since our analyses indicate it was uncertain if percutaneous surgery improves resolution of trigger finger during the follow-up of two to six months, with low-quality evidence, when compared to open surgery; and it was uncertain if there is any difference between the percutaneous and open surgical methods in reducing pain intensity (follow-up of one week), recurrence rate and risk of adverse events or neurovascular injury (follow-up two to six months), with very low-quality evidence. However there were methodological differences between the two reviews, since Huisstede 2010 carried out only one qualitative analysis of the data using the methodology described by Van Tulder 2003, while we not only carried out a qualitative but also quantitative analysis of the data (see Data and analyses), also highlighting the fact that the outcomes we regarded as relevant (satisfaction, recurrence, adverse events and neurovascular injury) were not assessed by Huisstede 2010.

Wang 2013 systematically assessed the effect of percutaneous surgery compared with open surgery or with steroid injection, basing the results on seven studies (six RCTs and one quasi-RCT), totalling 676 participants (Bamroongshawgasame 2010; Chao 2009; Dierks 2008; Gilberts 2001; Maneerit 2003; Sato 2012; Zyluk 2011). Four studies were included in the analysis that compared percutaneous surgery versus steroid injection (Chao 2009; Maneerit 2003; Sato 2012; Zyluk 2011), which showed favourable results for the treatment with percutaneous surgery for the outcome 'failure of the treatment' (no resolution of the trigger after treatment or trigger relapse after temporary recovery with treatment), but there were no differences between groups in the assessment of complications. Four studies were included in the comparison analysis between percutaneous surgery versus open surgery (Bamroongshawgasame 2010; Dierks 2008; Gilberts 2001; Sato 2012), which showed no difference between percutaneous surgery versus open surgery in the frequency of failure and complications of the treatments. Although in the comparison between percutaneous surgery versus steroid injection our results for the outcome 'adverse events' were consistent with the results published by Wang 2013, there are several differences between the two reviews: while Wang 2013 analysed three studies - Chao 2009, Sato 2012 and Zyluk 2011 - that compared a single intervention in each group (percutaneous surgery versus steroid injection) in conjunction with the study of Maneerit 2003, which carried out co-interventions in one of the comparison groups (analysing percutaneous surgery plus steroid injection versus steroid injection), we included five studies - Aref 2014, Chao 2009, Sato 2012, Singh 2005 and Zyluk 2011 - that assessed only a single intervention in each comparison group (percutaneous surgery versus steroid injection). In another comparison group we analysed separately the study of Maneerit 2003, because when one intervention is added to the other we can change the outcome of the procedure. Moreover, Wang 2013 assessed the data only after one infiltration application, while our assessment was after one or more application; our results showed it is uncertain if when compared with one or more applications of steroid injection, the percutaneous surgery promotes increased resolution and decreased recurrence rates, adverse events and neurovascular injury in the follow-up of six to 12 months, and also in pain relief in the follow-up of one month; moreover, the outcomes we considered as relevant (pain and functional status of the hand) were not assessed by Wang 2013. In the comparison between percutaneous surgery versus open surgery Wang 2013 found four studies - Bamroongshawgasame 2010, Dierks 2008, Gilberts 2001 and Sato 2012 -, while we included five trials (Bamroongshawgasame 2010; Dierks 2008; Gilberts 2001; Nikolaou 2017; Sato 2012), but our analysis obtained compatible results, also showing that it is uncertain if one of the surgical methods is better than the other method with regard to resolution, recurrence, adverse events and neurovascular injury, in the follow-up of two to six months. Wang 2013 did not use any method to classify the evidence found, while we classified the evidence as low quality (resolution) and as very low-quality (recurrence, adverse events and neurovascular injury), using the software GRADEpro GDT. Unlike our study, Wang 2013 did not assess studies that compared open surgery with steroid injection (with or without hyaluronic acid plus) or studies that compared other types of surgical treatments (e.g. endoscopic surgery) or different kinds of incision for open surgery. Our assessment of the risk of bias is less favourable than that assessed by Wang 2013, as this study used scores to assess the internal validity of the studies, which can yield questionable assessments (Detsky 1992), while we used the Cochrane 'Risk of bias' tool, which is more reliable (Higgins 2011a).

AUTHORS' CONCLUSIONS

Implications for practice

There is very low to low-quality evidence for a set of 14 heterogeneous clinical trials regarding surgical treatment for finger trigger in adults. It is uncertain if open surgery is better than steroid injection in trigger resolution at six to 12 months following treatment, due to very low quality evidence, although the open surgical treatment provide a less recurrence rate (follow-up of six to 12 months), but it increases the incidence of pain during the first follow-up week, with low-quality evidence. It is uncertain whether there is any benefit in decreased adverse events or neurovascular injury rates, with low-quality evidence. It is uncertain whether when compared with steroid infiltration, the percutaneous surgery has any benefits in the resolution of trigger finger, pain relief and reduced recurrence rates or adverse events, with very low-quality evidence. It is uncertain whether there is any benefit in decreased neurovascular injury rates, with low-quality evidence. It is uncertain whether the association of steroid infiltration with ultrasound-guided hyaluronic acid can increase its effectiveness when compared with open surgery because the available evidence comes from a small study of very low quality. It is uncertain if percutaneous surgery plus steroid injection is more effective than the treatment with steroid injection in the resolution of trigger finger, as the evidence was very low quality; it is also uncertain whether there is any benefit in reducing adverse events and neurovascular injury, as these were rarely reported, and the evidence was very low quality. Percutaneous surgery has similar rates of symptom resolution as open surgery at two to six months' follow-up (low-quality evidence), and it is uncertain whether either surgery has any advantage in decreasing pain intensity (very low quality evidence), trigger recurrence (very low quality evidence), adverse events (very low quality evidence) and neurovascular injury (very low quality evidence). It is uncertain whether endoscopic surgery has the same effectiveness as open surgery in trigger resolution in follow-up at three months, due to very low quality evidence; it is also uncertain whether there is any benefit for the occurrence of adverse events or neurovascular injury, with very low quality evidence. It is unclear whether one of the three types of skin incision performed for open surgery treatment (transverse incision about 2-3 mm distally from the distal palmar crease, transverse incision in the distal palmar crease or longitudinal incision) provides better functional results of the hand when compared to each other, because the available evidence comes from a small study of very low-quality.

Implications for research

More research is needed to elucidate the best approach for treating trigger finger in adults, as there is still no high-quality evidence supporting any surgical method. Although three studies are currently in progress (see Ongoing studies), more large studies of good methodological quality are required to provide additional evidence.

It is imperative that future studies should be randomised controlled trials and comply with the CONSORT statement to formulate and report non-pharmacological studies (Boutron 2008). The creation of standard norms for future research can facilitate the interpretation of results and speed up the process in order to achieve more consistent evidence.

Future research should include adult participants with trigger finger at any stage, and should present data that enables sub-grouping participants according to age, follow-up time (up to three months, more than three to six months, and more than six months) and trigger stage (using the classification of Quinnell 1980). Authors should use the outcomes of this review to assess the treatment methods, standardising resolution such as the harmonious slip of the flexor tendons after performing the procedure, measuring pain through the VAS score and assessing the functional status of the hand by means of a validated questionnaire (such as the DASH score), evaluating patient satisfaction using the Satisfaction Visual Analog Scale (SVAS score, gradated from zero to 10) or measuring participant-reported treatment success as a dichotomous outcome, considering recurrence as triggering relapse after a period of resolution and notifying any type of adverse events (including neurovascular injury). Larger trials, preferably multicentric with long follow-up periods, may allow the verification of differences in the incidence of adverse events among the various treatment methods. Cost assessment must also be performed because current evidence has shown no differences between the types of surgical treatments available and this can be a determining factor in choosing the treatment.

We emphasise the importance of clearly describing the process of randomisation and allocation concealment, and also reporting the data completely by providing mean and standard deviations for continuous data. We suggest that participants comply with a minimum of one-year follow-up as there are several reports of recurrence after six months. Finally, we recommend implementing the same rehabilitation programme and the same form of analgesia in both groups.

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Percutaneous trigger finger release, probe knife compared with 18-gauge needle : A randomized control trial.. Ongoing study **Main ID**: TCTR20140529001**Date of registration**: May 29, 2014.**Last refreshed on**: September 11, 2017.**Date of first enrolment**: May 30, 2014.**Status**: Active, not recruiting.**Estimated Study Completion date**: not reported..

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A1-Pulley release using open conventional technique or percutaneously with a modified Kirschner wire: a prospective randomised-controlled trial.. Ongoing study **Main ID**: TCTR20150416001.**Date of registration**: 16 April 2015.**Last refreshed on**: 11 September 2017.**Date of first enrolment**: 16 April 2015.**Status**: recruiting.**Estimated Study Completion date**: 31 December 2016..

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* *Indicates the major publication for the study*

CHARACTERISTICS OF STUDIES

Characteristics of included studies *[ordered by study ID]*

Aref 2014

Methods	**Study design**: quasi-randomised controlled trial. **Duration of the study**: from January 2011 to December 2013. **Protocol was published before recruitment of patients**: not reported. **Details of trial registration**: not registered. **Funding sources**: none known.
Participants	**Place of study**: Mazandaran University of Medical Sciences, Iran. **Number of participants assigned**: 50 participants (50 fingers); 25 percutaneous surgery and 25 steroid injection **Number of participants assessed**: 50 participants (50 fingers); 25 percutaneous surgery and 25 steroid injection **Inclusion criteria**: • Participants who presented with grade II or III trigger digit as classified by Quinnell 1980. **Exclusion criteria**: • Participants with trigger thumbs were excluded. **Age**: • Total of participants (mean/range): 48/40 to 65 years. **Gender**: • Total of participants: 20 male; 30 female. **Side**: • Total of participants: 31 dominant hand and 19 non-dominant hand. **Digits**: • Total of participants: 9 index, 26 long, 10 ring and 5 little. **Classification of injury**: trigger fingers were classified according to the Quinnell 1980 criteria (graded I to V).
Interventions	**Timing of intervention**: not reported. **Duration of treatment**: not reported. **Type of intervention**: • Percutaneous surgery • Steroid injection: 1 mL of triamcinolone mixed with 1 mL of 1% lidocaine was injected into the tendon sheath and around the nodule. **Rehabilitation**: the authors did not clearly describe whether all study participants received physiotherapy **Any co-interventions**: analgesia was given for 3 days.
Outcomes	**Length of follow-up**: • Follow-up was 9 months. • Participants were evaluated weekly for 6 consecutive weeks. **Loss of follow-up**: not reported. **Primary outcomes**: *Symptomatic relief*: the authors did not clearly define what they considered as "symptomatic relief" and reported incomplete data, stating only that both groups showed im-

	proved symptoms within 2 weeks of follow-up, and after 2 weeks the response was better in the steroid injection group *Patient satisfaction.* *Complications (adverse events)*: • Partial loss of movement. • Dysaesthesia. • Pulley or tendon injury. • Skin atrophy or hypopigmentation. **Secondary outcomes**: *Pain*:*measured by Visual Analog Scale (VAS)* *Recurrence of triggering*: the authors did not clearly define what they considered recurrence **Outcomes included in this review**: *Pain*: measured by Visual Analog Scale (VAS). *Patient satisfaction.* *Recurrence of triggering* *Adverse events*: • Partial loss of movement. • Dysaesthesia. • Pulley or tendon injury. • Skin atrophy or hypopigmentation.
Notes	• Pain and patient satisfaction were described incompletely (no numerical data were reported), and we were unable to include these data in the results. • We tried unsuccessfully to contact the authors to obtain further information on pain (VAS-score) and patient satisfaction. • The authors did not clearly report if there were losses to follow-up.

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	High risk	Quasi-randomised controlled trial. Participants were randomised to either steroid injection or percutaneous surgery using their birth year. Those with even numbers were allocated to the steroid group and uneven numbers to the percutaneous group
Allocation concealment (selection bias)	High risk	Quasi-randomised controlled trial.
Blinding of participants and personnel (performance bias) All outcomes	High risk	Participants and personnel were not blinded.
Blinding of outcome assessment (detection bias) - subjective outcomes (e.g. resolution, recurrence, pain, function, satisfaction) All outcomes	High risk	The self-reported subjective outcomes assessors were not blinded

Aref 2014 (*Continued*)

Blinding of outcome assessment (detection bias) - objective outcomes (e.g. adverse events, neurovascular injury) All outcomes	High risk	The objective outcome assessors were not blinded.
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Not reported. The authors did not clearly described whether all study participants completed follow-up
Selective reporting (reporting bias)	High risk	There was no protocol published. Outcome of interest in the review (resolution of trigger finger and functional status of the hand) were not reported. Pain was reported incompletely, without numerical values
Other bias	Unclear risk	The authors did not report data about baseline balance, and they did not clearly report about care providers and rehabilitation

Bamroongshawgasame 2010

Methods	**Study design**: randomised controlled trial. **Duration of the study**: 1 May 2007 to 31 December 2008. **Protocol was published before recruitment of patients**: not reported. **Details of trial registration**: not reported. **Funding sources**: none known.
Participants	**Place of study**: Thailand. **Number of participants assigned**: 142 participants (160 fingers); 80 percutaneous surgery and 80 open surgery **Number of participants assessed**: 142 participants (160 fingers); 80 percutaneous surgery and 80 open surgery. **Inclusion criteria**: • Failure non-surgical treatment for 3 months. • At least 1 local steroid injection. • Grade II, III or IV trigger digit as classified by Froimson 1993. **Exclusion criteria**: • Clinically active osteoarthritis of the affected hand. **Age**: • Percutaneous surgery (mean/range): 48.6/22 to 72 years. • Open surgery (mean/range): 46.2/24 to 76 years. **Gender**: • Percutaneous surgery: 28 male; 44 female. • Open surgery: 30 male; 40 female. **Side**: not reported. **Digits**: • Percutaneous surgery: 23 thumb, 8 index, 27 long, 20 ring and 2 little.

	• Open surgery: 26 thumb, 6 index, 24 long, 23 ring and 1 little. **Classification of injury**: Trigger fingers were graded according to Froimson's modification of Quinnell's classification (graded I to IV) (Froimson 1993).
Interventions	**Timing of intervention**: at least 3 months. **Duration of treatment** • Percutaneous surgery (mean operative time): 1.8 minutes. • Open surgery (mean operative time): 2.2 minutes. **Type of intervention**: • Percutaneous surgery: a full handle knife 45° was inserted 2 mm proximal to the proximal edge of the A1 pulley; when the distal edge was reached, the knife was moved distally to proximally, releasing the A1 pulley. • Open surgery: transverse incision was made over the involved metacarpal head, and the A1 pulley was transected under direct observation. **Rehabilitation**: not reported. **Any co-interventions**: not reported.
Outcomes	**Length of follow-up**: • Follow-up was 8 weeks. • Participants were evaluated at 1, 2, 3, 4, 6, and 8 weeks. **Loss of follow-up**: none lost to follow-up. **Primary outcomes**: *Operative time.* *Range of motion of finger PIP or thumb IP.* *Patient satisfaction score.* *Patient pain score.* *Surgical complications (adverse events)*: • Section of all or a portion of the A2 pulley. *Neurovascular injury*. **Outcomes included in this review**: *Resolution of trigger finger*: considered as the relief of pain and the cessation of finger locking after the procedure. Although reported in the study, it was not considered as primary outcome by the author *Pain (0 to 3 scale).* *Satisfaction scores (0 to 3 scale).* *Recurrence of triggering*: the author did not clearly define what he considered recurrence. Although reported in the study, it was not considered as primary outcome by the author *Adverse events measured by*: • Section of all or a portion of the A2 pulley. *Neurovascular injury*.
Notes	• Pain and satisfaction scores were presented graphically only, and we were unable to include these data in the analyses. • We tried unsuccessfully to contact the authors to obtain further information on absolute numerical values and standard deviations for pain (VAS-score) and satisfaction scores.
Risk of bias	

Bamroongshawgasame 2010 (*Continued*)

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	The method of generating the random sequence was not reported
Allocation concealment (selection bias)	Unclear risk	Not reported.
Blinding of participants and personnel (performance bias) All outcomes	High risk	Participants and personnel were not blinded.
Blinding of outcome assessment (detection bias) - subjective outcomes (e.g. resolution, recurrence, pain, function, satisfaction) All outcomes	High risk	The self-reported subjective outcomes assessors were not blinded
Blinding of outcome assessment (detection bias) - objective outcomes (e.g. adverse events, neurovascular injury) All outcomes	High risk	The objective outcome assessors were not blinded.
Incomplete outcome data (attrition bias) All outcomes	Low risk	The authors did not report missing data. All participants received treatment and were followed.
Selective reporting (reporting bias)	High risk	No protocol was published. Pain and satisfaction score were measured by non-validated instruments and the results were exhibited in figures, with inaccurate values and no measure of variance, compromising the assessment
Other bias	Low risk	There was no baseline imbalance, and no risk of bias was associated with care providers or differences in rehabilitation

Callegari 2011

Methods	**Study design**: randomised controlled trial. **Duration of the study**: January 2007 to May 2007. **Protocol was published before recruitment of patients**: not reported. **Details of trial registration**: not reported. **Funding sources**: none known.
Participants	**Place of study**: Varese, Italy. **Number of participants assigned**: 30 participants (30 fingers); 15 open surgery and 15 steroid injection plus hyaluronic acid injection ultrasound-guided **Number of participants assessed**: 30 participants (30 fingers); 15 open surgery and 15

	steroid injection plus hyaluronic acid injection ultrasound-guided **Inclusion criteria**: • Age between 35 and 70 years old. • Clinical signs and symptoms of stenosing tenosynovitis of the flexor tendons and in whom diagnosis was confirmed by ultrasound. **Exclusion criteria**: Trigger finger grade IV. *Comorbidities*: • Diabetes mellitus. • Rheumatoid arthritis. • Hypercholesterolemia. • Hypotension. • Hypertension. **Age**: • Open surgery (mean/range): 52.13/40 to 70 years. • Injection group (mean/range): 52.86/35 to 69 years. **Gender**: • Open surgery: 4 male; 11 female. • Injection group: 6 male; 9 female **Side**: not reported. **Digits**: 16 thumb, 7 ring and 7 long. **Classification of injury**: Trigger fingers were graded according to Froimson's modification of Quinnell's classification (graded I to IV) (Froimson 1993).
Interventions	**Timing of intervention**: average period: 3.5 months of symptoms (range 1 to 6 months) **Duration of treatment**: the duration of the surgical procedure was not reported. Hyaluronic acid injection was injected 10 days after steroid injection (injection group) **Type of intervention**: • Open surgery: patients underwent open surgery by conventional technique under locoregional anaesthesia and a haemostatic pressure cuff inflated around the upper arm. The procedure was carried out on a day surgery basis and patients were discharged in the evening with a compression dressing to be kept in place for 4 days until it was changed in the outpatient clinic. Sutures were removed 2 weeks after surgery. • Injection group: inject methylprednisolone acetate 40 mg/1 mL with 0.8 mL lidocaine chlorhydrate 2% into the sheath of the flexor tendons, distally to the A1 pulley, under ultrasound guidance. 10 days later, 1 mL 0.8% hyaluronic acid was injected using the same technique. **Rehabilitation**: • Open surgery: the patients started mobilisation of the finger after 4 days. • Injection group: therapy was not reported. **Any co-interventions**: 10 patients in open surgery group needed physiotherapy and local or oral analgesics for complete resolution of symptoms, which was approximately 30 to 40 days post surgery
Outcomes	**Length of follow-up**: 1 year. Participants were evaluated before intervention, at 6 weeks and at 3, 6, and 12 months **Loss of follow-up**: none lost to follow-up. **Primary outcomes**:

	Resolution of trigger finger: considered as the remission of symptoms within 6 weeks, with no recurrence within 6 months *Recurrence of triggering*: was considered the return of any degree of triggering after a full remission period of trigger finger **Secondary outcomes**: *Pain*: measured by Visual Analog Scale (VAS: 0 to 10 scale). *Functional status of the hand*: was used DASH (0 to 100%). *Satisfaction scores*: measured by Satisfaction Visual Analog Scale (SVAS: 0 to 10 scale) **Outcomes included in this review**: *Resolution of trigger finger* *Pain*: measured by Visual Analog Scale (VAS: 0 to 10 scale). *Functional status of the hand*: measured by DASH (0 to 100%). *Satisfaction scores*: measured by Satisfaction Visual Analog Scale (SVAS: 0 to 10 scale) *Recurrence of triggering*: *Adverse event* (Although reported in the study, it was not considered as primary outcome by the authors): • Partial loss of movement. • Algodystrophic syndrome.
Notes	• The authors did not report standard deviations on VAS, DASH and SVAS scores. • We tried unsuccessfully to contact the authors to obtain further information on standard deviations for pain (VAS-score), functional status of the hand (DASH-score) and patient satisfaction (SVAS-score).

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	The method of generating the random sequence was not reported
Allocation concealment (selection bias)	Unclear risk	Not reported.
Blinding of participants and personnel (performance bias) All outcomes	High risk	Participants and personnel were not blinded.
Blinding of outcome assessment (detection bias) - subjective outcomes (e.g. resolution, recurrence, pain, function, satisfaction) All outcomes	High risk	The self-reported subjective outcomes assessors were not blinded
Blinding of outcome assessment (detection bias) - objective outcomes (e.g. adverse events, neurovascular injury) All outcomes	High risk	The objective outcome assessors were not blinded.

Callegari 2011 (*Continued*)

Incomplete outcome data (attrition bias) All outcomes	Low risk	The authors did not report missing data. All participants received treatment and were followed.
Selective reporting (reporting bias)	High risk	No protocol was published. Although outcomes of interest in the review were reported, the authors failed to report any measure of variance for the validated instruments (VAS, DASH and SVAS)
Other bias	High risk	There were different rehabilitations in 2 groups. In both groups, at the first follow-up visit, participants were advised to mobilise the finger, depending on the level of pain experienced, but 10 participants in open surgery group needed physiotherapy, and local and/or oral analgesics for complete resolution of symptoms

Chao 2009

Methods	**Study design**: randomised controlled trial. **Duration of the study**: January 2005 to February 2007. **Protocol was published before recruitment of patients**: not reported. **Details of trial registration**: not reported. **Funding sources**: none known.
Participants	**Place of study**: China. **Number of participants assigned**: 86 participants (97 trigger thumbs); 42 participants (47 thumbs) in percutaneous surgery group and 44 patients (50 thumbs) in steroid injection group **Number of participants assessed**: 83 participants (93 trigger thumbs); 41 participants (46 thumbs) in percutaneous surgery group and 42 patients (47 thumbs) in steroid injection group **Inclusion criteria**: idiopathic adult trigger thumbs with grade III-V on the Quinnell classification **Exclusion criteria**: patients who had rheumatoid arthritis, diabetes mellitus or chronic systemic disease **Age**: • Percutaneous surgery: the average was 48 years (27 to 65). • Steroid injection: the average age was 49 years (28 to 72). **Gender**: • Percutaneous surgery: 29 female and 12 male. • Steroid injection: 28 female and 14 male. **Side**: • Percutaneous surgery: 33 right and 13 left. • Steroid injection: 36 right and 11 left.

	Digits: 97 thumbs. **Classification of injury**: The trigger thumb was graded according to Quinnell classification (graded I to V) (Quinnell 1980).
Interventions	**Timing of intervention**: 4 months' duration of the symptoms in both groups. **Duration of treatment**: not reported. **Type of intervention**: • Percutaneous release with a new instrument called mini scalpel-needle (MSN), based on acupuncture. • Injection with 1 ml triamcinolone acetonide (10 mg/ml). Previous injection of the 0.5 ml of 1% lidocaine was infiltrated into the skin and tissue around the tendon sheath. When necessary a second injection at 1 week was realised. **Rehabilitation**: did not have rehabilitation. **Any co-interventions**: topical NSAIDs were administered for 3 days with the occasional use of paracetamol for pain control in both groups when necessary
Outcomes	**Length of follow-up**: 1 year **Loss of follow-up**: 1 patient (1 thumb) in percutaneous surgery group and 2 patients (3 thumbs) in steroid injection group were lost to follow-up at 12 months and were excluded **Primary outcomes**: Successful procedure or satisfaction (*resolution of trigger finger)*: "satisfactory" was considered to be participants who progressed with pain score lower than or equal to 1 (VAS scale) and cessation of triggering *Pain*:*measured by Visual Analog Scale (VAS*:*0 to 10 scale).* *Adverse events measured*: • Infection. • Tendon bowstringing (tendon or pulley injury). *Neurovascular injury*. **Outcomes included in this review**: *Resolution of trigger finger*: "satisfactory" was considered to be participants who progressed with pain score lower than or equal to 1 (VAS scale) and cessation of triggering *Pain*: measured by Visual Analog Scale (VAS: 0 to 10 scale). *Recurrence of triggering*: the authors did not evaluate it as a study outcome, but they published indirect data on recurrence *Adverse events measured*: • Infection. • Tendon bowstringing (tendon or pulley injury). *Neurovascular injury*.
Notes	• The follow-up data were collected by clinical examination (69 participants) or by telephone interview (14 participants). • In the study, the authors use the words "satisfaction", "success of procedure" and "satisfactory results" as synonyms for trigger finger resolution.

Risk of bias

Bias	Authors' judgement	Support for judgement

Chao 2009 (*Continued*)

Random sequence generation (selection bias)	Low risk	The patients were randomly assigned by the selection of number 1 or 2 from sealed envelopes in the presence of a witness
Allocation concealment (selection bias)	Low risk	Sealed envelopes were used.
Blinding of participants and personnel (performance bias) All outcomes	High risk	Participants and personnel were not blinded.
Blinding of outcome assessment (detection bias) - subjective outcomes (e.g. resolution, recurrence, pain, function, satisfaction) All outcomes	High risk	The self-reported subjective outcomes assessors were not blinded
Blinding of outcome assessment (detection bias) - objective outcomes (e.g. adverse events, neurovascular injury) All outcomes	High risk	The objective outcome assessors were not blinded.
Incomplete outcome data (attrition bias) All outcomes	Low risk	Missing outcome data were balanced in numbers across intervention groups; 1 thumb 1/47 (2%) in percutaneous release group and 3 thumbs 3/50 (6%) in steroid injection group were lost to follow up of 12 months and excluded; however they were reported
Selective reporting (reporting bias)	High risk	No protocol was published. Functional status (as primary outcome using validated instruments to measure hand function) was not evaluated by the authors
Other bias	Unclear risk	There was no baseline imbalance, but the authors did not describe about care providers or rehabilitation

Dierks 2008

Methods	**Study design**: quasi-randomised controlled trial. **Duration of the study**: during the year 2003. **Protocol was published before recruitment of patients**: not reported. **Details of trial registration**: not registered. **Funding sources**: none known.
Participants	**Place of study**: Oldenburg, Germany. **Number of participants assigned**: 36 participants (36 fingers); 20 percutaneous surgery and 16 open surgery

	Number of participants assessed: 36 participants (36 fingers); 20 percutaneous surgery and 16 open surgery **Inclusion criteria**: patients with primary trigger finger and age between 18 and 80 years **Exclusion criteria**: patients with trigger thumb, more than 1 trigger finger, previous operations of the upper extremity, evidence of symptomatic synovitis, or diseases possibly influencing pain scores or hand function (e.g. nerve entrapments, neuropathy, diabetes, and rheumatoid arthritis), or patients with any joint extension lag **Age**: • Percutaneous surgery (mean): 62 years (41 to 79). • Open surgery (mean): 64 years (39 to 88). **Gender**: • Percutaneous surgery: 9 male and 11 female. • Open surgery: 7 male and 9 female. **Side**: not reported. **Digits**: not reported. **Classification of injury**: not reported.
Interventions	**Timing of intervention**: • Percutaneous surgery (mean): 7 months (1 to 36). • Open surgery (mean): 12 months (1 to 60). **Duration of treatment**: • Percutaneous surgery: 26 seconds. • Open surgery: 4 min 17 seconds. **Type of intervention**: • Percutaneous surgery: the affected digit was placed in extension. At the proximal level of the A1 pulley, a L15 blade scalpel was put through the skin and pushed palmarward with the backside of the knife. Then the knife was positioned on top of the distal end of the A1 pulley centred at the palmar axis of the tendon sheath, and the sharp side of the knife was directed dorsally. External pressure from the surgeon's finger on the skin is performed to put the knife through the A1 pulley. • Open surgery: a longitudinal incision was placed in a skin crease at the level of the A1 pulley. The neurovascular structures were preserved by Langenbeck hooks. The A1 pulley was opened longitudinally. The skin was closed with 4.0 Ethylon sutures. **Rehabilitation**: A direct postoperative mobilization protocol was used in both groups. The authors did not describe which protocol was used, nor for how long it was used **Any co-interventions**: not reported.
Outcomes	**Length of follow-up**: 12 weeks. **Loss of follow-up**: none. **Primary outcomes**: *Range of motion (ROM) of the PIP joint.* *Grip strength.* *Pain*: mean score assessed using a scale from 1 to 6; 1 = no pain and 6 = extreme pain *Time of surgery.* *Postoperative complications (adverse events and neurovascular injury).* *Costs of the surgical techniques.* **Outcomes included in this review**: *Resolution of trigger finger*: considered as complete relief of symptoms (the authors did not

	evaluate it as a study primary outcome, but they published indirect data on resolution) *Pain*: mean score assessed using a scale from 1 to 6; 1 = no pain and 6 = extreme pain *Recurrence of triggering*: the authors did not evaluate it as a study primary outcome, but they published indirect data on recurrence *Adverse events*: • Inflammation. *Neurovascular injury*.
Notes	• The authors did not report on functional status of the hand and patients' satisfaction. • The authors reported inclusion criterion of participants aged 18 to 80 years, but they presented results of participants aged 39 to 88 years. • Open surgical technique was more expensive. The cost difference (personnel costs excluded) was EURO 7 (7 euros).

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	High risk	Quasi-randomised controlled trial. Participants were randomised to either open or percutaneous surgery using their patient numbers. When their numbers started with an uneven number, they were treated percutaneously, but if their numbers started an even number, they were treated by open surgery
Allocation concealment (selection bias)	High risk	Quasi-randomised controlled trial.
Blinding of participants and personnel (performance bias) All outcomes	High risk	Participants and personnel were not blinded.
Blinding of outcome assessment (detection bias) - subjective outcomes (e.g. resolution, recurrence, pain, function, satisfaction) All outcomes	High risk	The self-reported subjective outcomes assessors were not blinded
Blinding of outcome assessment (detection bias) - objective outcomes (e.g. adverse events, neurovascular injury) All outcomes	High risk	The objective outcome assessors were not blinded.
Incomplete outcome data (attrition bias) All outcomes	Low risk	The authors did not report missing data. All participants received treatment and were followed.

Dierks 2008 (*Continued*)

Selective reporting (reporting bias)	High risk	No protocol was published. Functional status (as primary outcome using validated instruments to measure hand function) was not evaluated by the authors and pain was measured by non-validated instrument
Other bias	Low risk	There was no baseline imbalance, and no risk of bias was associated with care providers or differences in rehabilitation

Gilberts 2001

Methods	**Study design**: randomised controlled trial. **Duration of the study**: between February 1993 and October 1994. **Protocol was published before recruitment of patients**: not reported. **Details of trial registration**: not reported. **Funding sources**: none known.
Participants	**Place of study**: Rotterdam, the Netherlands. **Number of participants assigned**: 96 participants (100 trigger digits); 54 percutaneous surgery and 46 open surgery **Number of participants assessed**: 96 participants (100 trigger digits); 54 percutaneous surgery and 46 open surgery **Inclusion criteria**: Patients had to be older than 18 years and have symptoms of a trigger digit for at least 1 month **Exclusion criteria**: • Evidence of inflammation at the time of presentation (to exclude active rheumatoid arthritis or other connective tissue disease). • Previous surgery on the affected digit. **Age**: • Percutaneous surgery (mean): 62 years (24 to 88). • Open surgery (mean): 60 years (24 to 81). **Gender**: • Percutaneous surgery: male/female = 1/1.5. • Open surgery: male/female = 1/2.3. **Side**: not reported. **Digits**: although the authors assessed the results of 100 fingers, they reported data on 99 fingers • Percutaneous surgery: 23 thumb, 2 index, 17 long, 7 ring and 5 little. • Open surgery: 17 thumb, 4 index, 12 long, 12 ring and 0 little. **Classification of injury**: not reported.
Interventions	**Timing of intervention**: Mean duration of symptoms: • Percutaneous surgery: 6 months (1 to 24). • Open surgery: 12 months (1 to 144).

	Duration of treatment: • Percutaneous surgery: 7 minutes. • Open surgery: 11 minutes. **Type of intervention**: Percutaneous surgery: • The affected digit was placed in extension. At the level of the A1 pulley an 18-gauge hypodermic needle was inserted into the flexor sheath with the opening directed distally. After ascertaining that the flexor tendon was clear (active flexion shows no movement of the needle), the needle was turned 90° to direct the bevelled edges longitudinally. By moving the needle, using the skin as a pivot point, the flexor sheath and the A1 pulley were divided, resulting in a typical grating sound. When necessary, a second insertion of the needle was made to obtain full release of the trigger digit. Any residual triggering was tested by active flexion of the affected digit. A compressive bandage was applied. Open surgery: • A transverse incision was placed in a skin crease at the level of the metacarpal head. The flexor sheath was opened longitudinally, incorporating the A1 pulley. Any residual triggering was tested by active flexion of the affected digit. The skin was closed with a 4.0 nylon suture. A compressive bandage was applied. **Rehabilitation**: • Exercises were started immediately in both groups. • The authors did not describe which protocol was used, nor for how long it was used. **Any co-interventions**: not reported.
Outcomes	**Length of follow-up**: Follow-up was 12 weeks. Patients were examined 10 days, 6 weeks, and 12 weeks after surgery **Loss of follow-up**: not reported. **Primary outcomes**: *Mean duration of surgery (minutes).* *Mean duration of postoperative pain (days).* *Recovery of motor function (days).* *Return to work (days).* *Success rate (resolution of trigger finger)*: considered as the cessation of triggering, with no recurrence during follow-up (3 months) *Complications.* **Outcomes included in this review**: *Resolution of trigger finger*: considered as the cessation of triggering, with no recurrence during follow-up (3 months) *Pain*: reported the average postoperative pain duration in days. *Recurrence of triggering*: was reported in the study although it was not considered as primary outcome by the authors; the authors did not clearly define what they considered recurrence *Adverse event*: • Oedema. • Hematoma and adherence. *Neurovascular injury*.

Notes	• One adverse event that occurred in the percutaneous surgery group was not clearly specified by the author. • We tried unsuccessfully to contact the authors in order to obtain further information to clearly specify what this adverse event was.

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	The method of generating the random sequence was not reported
Allocation concealment (selection bias)	Low risk	Sealed envelopes were used.
Blinding of participants and personnel (performance bias) All outcomes	High risk	Participants and personnel were not blinded.
Blinding of outcome assessment (detection bias) - subjective outcomes (e.g. resolution, recurrence, pain, function, satisfaction) All outcomes	High risk	The self-reported subjective outcomes assessors were not blinded
Blinding of outcome assessment (detection bias) - objective outcomes (e.g. adverse events, neurovascular injury) All outcomes	High risk	The objective outcome assessors were not blinded.
Incomplete outcome data (attrition bias) All outcomes	Low risk	The authors did not report missing data. All participants received treatment and were followed.
Selective reporting (reporting bias)	High risk	No protocol was published. Pain and functional status of the hand (as primary outcomes, measured by validated instruments) were not evaluated by the authors
Other bias	Low risk	There was no baseline imbalance, and no risk of bias was associated with care providers or differences in rehabilitation

Hansen 2017

Methods	**Study design**: randomised controlled trial. **Duration of the study**: January 2012 to May 2015. **Protocol was published before recruitment of patients**: yes. **Details of trial registration**: ClinicalTrials.gov, www.clinicaltrials.gov NCT01486420 **Funding sources**: the authors have declared no conflicts of interest.
Participants	**Place of study**: Center for Planned Surgery, Regional Hospital Silkeborg, Silkeborg, Denmark **Number of participants assigned**: 165 participants (165 fingers); 84 open surgery and 81 steroid injection **Number of participants assessed**: 153 participants (153 fingers); 76 open surgery and 77 steroid injection **Inclusion criteria**: • Patients were ≥ 18 years old. • Patients with trigger finger classified as Quinnell Type IIb (history of uneven movement with or without pain or discomfort) or greater. **Exclusion criteria**: Patients were excluded if they had insulin-dependent diabetes mellitus, rheumatoid arthritis, amyloidosis, mucopolysaccharidosis, previous treatment of trigger finger in the included digit, Dupuytren disease affecting the included digit, or medical contraindications to corticosteroid injection **Age**: • Open surgery (mean): 60 years. • Steroid injection (mean): 60 years. **Gender**: • Open surgery: 27 male and 57 female. • Steroid injection: 27 male and 54 female. **Side**: 97 right and 68 left. **Digits:** the allocated digit was the thumb in 39%, index in 5%, middle in 25%, ring in 25%, and little in 6% **Classification of injury**: The trigger finger was graded according to Quinnell' classification modified by adding a history of uneven movement with pain or discomfort at the A1 pulley (graded I to V) (Quinnell 1980).
Interventions	**Timing of intervention**: • Open surgery (mean): 4 months. • Steroid injection (mean): 5 months. **Duration of treatment**: not reported. **Type of intervention**: • Open surgery was performed under local anesthesia with a tourniquet placed at the upper arm. At the level of the A1 pulley, an incision was made and blunt dissection was done down to the A1 pulley. A small, round-tipped dissection scissor was used to split the A1 pulley. After securing free movement of the flexor tendons, the skin was closed with nonabsorbable sutures, a light bandage was applied, and the tourniquet was released. As standard procedure, digital nerves were not explored in any digits. • Ultrasound-guided corticosteroid injection with a 23-gauge needle was performed with a linear transducer placed in an axial direction to identify the flexor tendons. All patients were injected with a corticosteroid solution containing 1 ml triamcinolone

	acetonide, 40 mg/ml (Kenalog; Bristol-Myers Squibb AB, New York) and 1ml Llidocaine, 10mg/ml. After intra-sheath placement of 1 ml of the corticosteroid solution, the needle was withdrawn just superficially to the A1 pulley, and the last 1 ml was injected outside the sheath in close proximity to the A1 pulley. **Rehabilitation**: not reported. **Any co-interventions**: not reported.
Outcomes	**Length of follow-up**: 12 months. The patients were prospectively assessed after 3 and 12 months **Loss of follow-up**: 1 patient in both groups were lost to follow-up at 3 months, and 1 participant in open surgery group and 2 participants in steroid injection group were lost to follow-up at 12 months and were excluded Six participants in open surgery group and one participant in steroid injection group did not receive allocated intervention **Primary outcomes**: *Resolution of trigger finger (cure)*: the authors considered normal movement with or without pain or discomfort after 12 months of follow-up **Secondary outcomes**: *Topical pain:* defined as patient-reported pain when pressure was applied on the palmar side of the hand at the level of the A1 pulley, assessed by a numerical rating scale from 1 to 10 (1 = no pain, and 10 = worst imaginable pain) *Complications (adverse events):* • Infection. • Neuropathy. • Bowstringing. • Flare (defined as the worsening of symptoms in a short time after the injection). • Failure (reported by patients at the 1-year follow-up interview). • Fat necrosis at the injection site. • Tendon rupture. **Outcomes included in this review**: *Resolution of trigger finger.* *Pain*: assessed by a numerical rating scale from 1 to 10 (1 = no pain, and 10 = worst imaginable pain) *Recurrence of triggering.* *Adverse event*: • Infection. • Bowstringing. • Flare (defined as the worsening of symptoms in a short time after the injection). • Fat necrosis at the injection site. • Tendon rupture *Neurovascular injury.*
Notes	• If patients presented with more than one affected finger, a single finger was arbitrarily chosen for inclusion based on the patient's request. • Outcomes were assessed at 3 months by personnel in the outpatient clinic, and at 12 months in a telephone interview by the first author. • The authors did not report the mean and standard deviations on pain score. They reported only the median and interquartile range (IQR). • We tried unsuccessfully to contact the authors to obtain further information on

	mean and standard deviations for pain. In the analyses of results we using the median as an approximate for the mean, and we calculate an approximate standard deviations (SD) based on IQR (using the formula: SD = IQR/1.35). • In the open surgery group eight allocated participants did not complete the follow-up (six patients were allocated but they did not receive the treatment, and two patients were operated but they were lost to follow-up at 12 months). In the steroid injection group four allocated participants did not complete the follow-up (one patient was allocated but he did not receive the treatment, and three patients were operated but they were lost to follow-up at 12 months).

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	The schedule for randomization was generated by the randomization software Research Randomizer (http://www.randomizer.org). The authors used a block randomization with blocks of 5 patients
Allocation concealment (selection bias)	Low risk	Opaque sealed envelopes were used.
Blinding of participants and personnel (performance bias) All outcomes	High risk	Participants and personnel were not blinded.
Blinding of outcome assessment (detection bias) - subjective outcomes (e.g. resolution, recurrence, pain, function, satisfaction) All outcomes	High risk	The self-reported subjective outcomes assessors were not blinded
Blinding of outcome assessment (detection bias) - objective outcomes (e.g. adverse events, neurovascular injury) All outcomes	High risk	The objective outcome assessors were not blinded.
Incomplete outcome data (attrition bias) All outcomes	Low risk	Missing outcome data were balanced in numbers across intervention groups; eight participants 8/84 (9%) in open surgery group and four participants 4/81 (5%) in steroid injection group were allocated to treatment, but they did not complete to follow up of 12 months and they were excluded; however they were reported
Selective reporting (reporting bias)	Low risk	The study protocol was previously published. No changes in methods were applied after the trial commenced

Hansen 2017 (*Continued*)

Other bias	Unclear risk	The groups were similar at baseline except for lower alcohol consumption in the open surgery group.The authors did not describe about differences in care providers or rehabilitation

Kloeters 2016

Methods	**Study design**: randomised controlled trial. **Duration of the study**: between January 2013 and February 2014. **Protocol was published before recruitment of patients**: not reported. **Details of trial registration**: not reported. **Funding sources**: the authors have declared no conflicts of interest.
Participants	**Place of study**: Nijmegen, the Netherlands. **Number of participants assigned**: 30 participants (32 trigger digits); Open surgery by transversal incision of the skin in the distal palmar crease: 11 trigger fingers Open surgery by transversal incision of the skin about 2-3 mm distally from distal palmar crease: 10 trigger fingers Open surgery by longitudinal incision of the skin at the level of the A1-pulley without crossing the distal palmar crease proximal: 11 trigger fingers **Number of participants assessed**: 30 participants (32 trigger digits). Open surgery by transversal incision of the skin in the distal palmar crease: 11 trigger fingers Open surgery by transversal incision of the skin about 2-3 mm distally from distal palmar crease: 10 trigger fingers Open surgery by longitudinal incision of the skin at the level of the A1-pulley without crossing the distal palmar crease proximal: 11 trigger fingers **Inclusion criteria**: • Patients had to be 18 years or older. • Diagnosis of at least grade II trigger finger according to the Quinnell classification (Quinnell 1980). • Duration of symptoms for at least 3 months. • Absence of surgical treatment of the affected finger. **Exclusion criteria**: • Participants with trigger thumbs were excluded. • More than one finger affected in one hand. • History of severe hand trauma. **Age (mean):** 61.77 years. **Gender**: 13 male and 17 female. **Side**: • Dominant hand: 14. • Non-dominant hand: 15. • Unknown: 3. **Digits**: 4 index, 17 long, 8 ring and 3 little finger.

	Classification of injury: The trigger finger was graded according to Quinnell classification (Quinnell 1980).
Interventions	**Timing of intervention**: at least 3 months. **Duration of treatment**: not reported. **Type of intervention**: All participants were submitted to open surgery, and was randomised to one of three kinds of skin incision: • Transversal in the distal palmar crease. • Transversal 2-3 mm distally from distal palmar crease. • Longitudinally at the level of the A1-pulley without crossing the distal palmar crease proximal. All surgeries were performed under local anesthesia. Tourniquet was placed at the Forearm at 250 mmHg and a incision pattern was carried out over a defined length of 15 mm. The A1-pulley was identified and fully opened by a longitudinal incision over the pulley. Approximately 2-3 mm in width of the A1-pulley were resected to reduce the risk for recurrence. The skin was then closed with Prolene 4-0 **Rehabilitation**: • Directly after surgery, all patients were instructed to use the hand without any specific limitations. **Any co-interventions**: not reported.
Outcomes	**Length of follow-up**: Follow-up was 12 months. Patients were examined 1, 3 and 12 months after surgery. **Loss of follow-up**: not reported. **Primary outcomes**: *Functional status of the hand*: was used DASH score. *Scar volume:* was measured using an high-resolution ultrasound. **Outcomes included in this review**: *Functional status of the hand*: was used DASH score.
Notes	• The authors did not report standard deviations on DASH score or data about how many participants evolved with hypertrophic scar or keloid, but they reported the mean standard error on DASH score. • We tried unsuccessfully to contact the authors to obtain further information on standard deviations for functional status of the hand (DASH-score), and about how many participants presented hypertrophic scar or keloid in yours hands. So we used the mean standard error in the forest plots calculator to get the standard deviations in analyses about DASH score.

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	The method of generating the random sequence was not reported
Allocation concealment (selection bias)	Unclear risk	Not reported.

Kloeters 2016 (*Continued*)

Blinding of participants and personnel (performance bias) All outcomes	High risk	Participants and personnel were not blinded.
Blinding of outcome assessment (detection bias) - subjective outcomes (e.g. resolution, recurrence, pain, function, satisfaction) All outcomes	High risk	The self-reported subjective outcomes assessors were not blinded
Blinding of outcome assessment (detection bias) - objective outcomes (e.g. adverse events, neurovascular injury) All outcomes	Unclear risk	The authors did not assess or report any objective outcome.
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Not reported.
Selective reporting (reporting bias)	High risk	No protocol was published. Outcomes of interest in the review (resolution of trigger finger and pain) were not reported
Other bias	High risk	There was baseline imbalance. The authors reported there was a significant difference in baseline DASH scores between groups

Maneerit 2003

Methods	**Study design**: randomised controlled trial. **Duration of the study**: October 1998 to December 2001. **Protocol was published before recruitment of patients**: not reported. **Details of trial registration**: not reported. **Funding sources**: none known.
Participants	**Place of study**: Bangkok, Thailand. **Number of participants assigned**: • 115 participants (127 triggering thumbs). • Percutaneous surgery with steroid injection: 66 thumbs in 60 participants. • Steroid injection alone: 61 thumbs in 55 participants. **Number of participants assessed**: • 125 triggering thumbs in 113 participants. • Percutaneous release with steroid injection: 65 thumbs in 59 participants. • Steroid injection alone: 60 thumbs in 54 participants. **Inclusion criteria**: Idiopathic adult trigger thumb grade II (actively correctable) III (passively correctable) or IV (fixed in flexion) according to the Quinnell classification (Quinnell 1980). **Exclusion criteria**:

	• Participants with history of trauma. • Participants with carpal tunnel syndrome were excluded. **Age**: • Percutaneous release with steroid injection (mean): 52 years (31 to 68). • Steroid injection alone (mean): 53 years (31 to 76). **Gender**: • Percutaneous release with steroid injection: 61 female and 4 male. • Steroid injection alone: 55 female and 5 male. **Side**: Percutaneous release with steroid injection: • Thumb affected (R/L): 31/34. • Hand dominance (R/L): 57/8. Steroid injection alone: • Thumb affected (R/L): 28/32. • Hand dominance (R/L): 55/5. **Digits:** 127 thumbs. **Classification of injury**: The trigger thumb was graded according to Quinnell classification (graded 0 to IV) (Quinnell 1980).
Interventions	**Timing of intervention**: Percutaneous release with steroid injection (mean): 4 months (1 to 36) Steroid injection alone (mean): 4 months (1 to 20). **Duration of treatment**: not reported. **Type of intervention**: Percutaneous release with steroid injection: • The release was done with an 18-gauge needle inserted at a point 1 mm to 2 mm distal to metacarpophalangeal joint crease, keeping the thumb in hyperextension position. After release the flexor tendon sheath was injected with 1 ml triamcinolone acetonide, 10 mg/ml. Steroid injection alone: • Participants were treated simply by injection of 1 ml triamcinolone acetonide and 1 ml of 1% lidocaine. **Rehabilitation**: not reported. **Any co-interventions**: • All participants in both groups received 20 paracetamol tablets for home medication. They were told to take the medicine only if they felt pain. • The mean paracetamol requirement in the first 2 weeks was 4 tablets in percutaneous release with steroid injection and 3 tablets in steroid injection.
Outcomes	**Length of follow-up**: range 23 months (6 to 42 months). Participants were evaluated at 2 and 6 weeks, and 6 or more months **Loss of follow-up**: 1 participant (1 thumb) was lost to follow-up at 6 months in both groups **Primary outcomes**: *Resolution of trigger finger*: "satisfactory" was considered to be participants who progressed with pain score lower than or equal to 1 (VAS scale) and cessation of triggering *Pain*: measured by Visual Analog Scale (VAS: 0 to 10 scale) and paracetamol requirement in the first 2 weeks

	Outcomes included in this review: *Resolution of trigger finger* *Pain*: measured by Visual Analog Scale (VAS: 0 to 10 scale). *Adverse events*: were reported in the study although not considered as primary outcomes by the author Superficial infection (cellulitis). Partial loss of movement. *Neurovascular injury*: was reported in the study although not considered as primary outcome by the author
Notes	• The authors did not report standard deviations on VAS score. • We tried unsuccessfully to contact the authors to obtain further information on standard deviations for pain (VAS-score). • The follow-up data were collected by clinical examination (78 participants) or by telephone interview (35 participants) between 6 and 42 (mean, 23) months.

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	The method of generating the random sequence was not reported
Allocation concealment (selection bias)	Unclear risk	Not reported.
Blinding of participants and personnel (performance bias) All outcomes	High risk	Participants and personnel were not blinded.
Blinding of outcome assessment (detection bias) - subjective outcomes (e.g. resolution, recurrence, pain, function, satisfaction) All outcomes	High risk	The self-reported subjective outcomes assessors were not blinded
Blinding of outcome assessment (detection bias) - objective outcomes (e.g. adverse events, neurovascular injury) All outcomes	High risk	The objective outcome assessors were not blinded.
Incomplete outcome data (attrition bias) All outcomes	Low risk	Missing outcome data were balanced in numbers across intervention groups. 1 thumb was lost in both groups at 6 months: in percutaneous surgery plus steroid injection group 1/66 (1.5%); and in steroid injection 1/61 (1.6%)
Selective reporting (reporting bias)	High risk	No protocol was published. The authors did not report standard deviations on VAS score, and the functional

Maneerit 2003 (*Continued*)

		status of the hand (using validated instruments) was not evaluated
Other bias	Unclear risk	There was no baseline imbalance and no risk of bias was associated with care providers, but the author did not report about rehabilitation

Nikolaou 2017

Methods	**Study design**: randomised controlled trial. **Duration of the study**: not reported. **Protocol was published before recruitment of patients**: yes. **Details of trial registration**: clinicaltrials.gov/ct2/show/study/NCT02830672. **Funding sources**: the authors have declared no conflicts of interest.
Participants	**Place of study**: National and Kapodistrian University of Athens, Greece. **Number of participants assigned**: 32 participants (32 fingers); 16 ultrasound-guided percutaneous surgery and 16 open surgery **Number of participants assessed**: 32 participants (32 fingers); 16 ultrasound-guided percutaneous surgery and 16 open surgery **Inclusion criteria**: • Participants affected by trigger finger or trigger thumb clinically and ultrasonographically examined. • Failure non-surgical treatment for 3 months. • Grade II, III or IV trigger digit as classified by Froimson 1993. **Exclusion criteria**: • Individuals under 18 years old. • Patients who were treated with a previous operation or a corticosteroid injection. • Individuals with inflammatory arthritis, tumor or autoimmune disease. • Patients with multiple trigger fingers. **Age**: mean age of 32 patients: 45.5 years old. • Percutaneous surgery (mean/range): not reported. • Open surgery (mean/range): not reported. **Gender**: 12 male; 20 female. • Percutaneous surgery (mean/range): not reported. • Open surgery (mean/range): not reported. **Side**: not reported. **Digits:** not reported. **Classification of injury**: Trigger fingers were graded according to Froimson's modification of Quinnell's classification (graded I to IV) (Froimson 1993).
Interventions	**Timing of intervention**: at least 3 months. **Duration of treatment**: not reported. **Type of intervention**: • Percutaneous surgery: under continuous sonographic imaging of the digit, an ophthalmic corneal/scleral V-Lance knife (Alcon, Novartis company) was inserted percutaneously, over flexor tendons proximally to the A1 pulley and towards their

	longitudinal axis. Then, the knife was advanced distally, just below A1 pulley and pressed palmary so as to loosen the thicken pulley. Thus, after having withdrawn the V-Lance knife, a thin hook with a long neck was introduced under the - now extended - A1 pulley. The hook penetrated the annular ligamentous structure facing palmary in order to protect the flexor tendons and subsequently removed proximally (in a steady quick move) carrying along and dissecting the A1 pulley. Intraoperatively and right after the performed dissection, each patient was clinically and sonographically evaluated for the achieved resolution of the triggering. • Open surgery: the section of the A1 pulley was done through a 10-15 mm skin incision. **Any co-interventions**: not reported.
Outcomes	**Length of follow-up**: • Follow-up was 12 weeks. • Participants were evaluated at 2, 4 and 12 weeks. **Loss of follow-up**: none lost to follow-up. **Primary outcomes**: *Resolution of triggering was expressed as the "success rate" per digit.* *The time for taking postoperative pain killers.* *QuickDASH score.* *Range of motion recovery.* *Return to normal activities (including work).* *Complications (adverse events).* *Cosmetic results.* **Outcomes included in this review**: *Resolution of triggering was expressed as the "success rate" per digit.* *Pain:* postoperative pain duration (measured by mean time in days for taking postoperative pain killers) *Functional status of the hand*: QuickDASH score. *Adverse events measured by*: • Infections. • Partial loss of movement.
Notes	• The authors did not report standard deviations on QuickDASH score. • We tried unsuccessfully to contact the authors to obtain further information on standard deviations for functional status of the hand (QuickDASH-score).

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	The method of generating the random sequence was not reported
Allocation concealment (selection bias)	Low risk	Closed envelopes were used.
Blinding of participants and personnel (performance bias) All outcomes	High risk	Participants and personnel were not blinded.

Nikolaou 2017 (*Continued*)

Blinding of outcome assessment (detection bias) - subjective outcomes (e.g. resolution, recurrence, pain, function, satisfaction) All outcomes	Low risk	The self-reported subjective outcomes assessors were blinded
Blinding of outcome assessment (detection bias) - objective outcomes (e.g. adverse events, neurovascular injury) All outcomes	High risk	The objective outcome assessors were not blinded.
Incomplete outcome data (attrition bias) All outcomes	Low risk	The authors did not report missing data. All participants received treatment and were followed.
Selective reporting (reporting bias)	Unclear risk	Although results were evaluated and explained according to protocol published in July 6, 2016 and the study was published in February 18, 2017, the paper was received in the World Journal of Orthopedics' editorial in July 4, 2016 before date of the protocol publication Although the protocol published by authors estimated the enrollment of 60 patients in the study, the sample of the paper was only 32 participants
Other bias	Unclear risk	The authors did not report data about baseline balance, and they did not clearly report about care providers and rehabilitation

Pegoli 2008

Methods	**Study design**: randomised controlled trial. **Duration of the study**: October 2005 to March 2006. **Protocol was published before recruitment of patients**: not reported. **Details of trial registration**: not reported. **Funding sources**: none known.
Participants	**Place of study**: University of Milan, Italy. **Number of participants assigned**: 200 participants (231 fingers); Endoscopic surgery: 114 trigger fingers in 100 participants. Open surgery: 117 trigger fingers in 100 participants. **Number of participants assessed**: 200 participants (231 fingers). Endoscopic surgery: 114 trigger fingers in 100 participants. Open surgery: 117 trigger fingers in 100 participants. **Inclusion criteria**:

	Participants affected by trigger finger, despite other concomitant disease **Exclusion criteria**: not reported. **Age**: • Endoscopic surgery (mean): 56 years (23 to 82). • Open surgery (mean): 61 years (33 to 79). **Gender**: • Endoscopic surgery: 33 male and 67 female. • Open surgery: 27 male and 73 female. **Side**: The authors reported data incompletely; in the endoscopic surgery group they reported the affected side in relation to the fingers, while in the open surgery group they reported the affected side in relation to the participants Endoscopic surgery: 71 (fingers) right hand and 43 (fingers) left hand Open surgery: 69 (participants) right hand and 31 (participants) left hand **Digits:** • Endoscopic surgery: 12 thumb, 23 index, 37 long, 34 ring and 8 little. • Open surgery: 13 thumb, 25 index, 31 long, 38 ring and 10 little. **Classification of injury**: not reported.
Interventions	**Timing of intervention**: not reported **Duration of treatment**: Endoscopic surgery (mean): 4 min and 30 seconds (range: 2 to 9 min) Open surgery (mean): 5 min (range: 2 to 7 min). **Type of intervention**: Endoscopic surgery: • Under local anaesthesia, with 2 sites of transverse incision that were distally at the level of the digital-palmar crease of the finger and proximally at the level of the palmar crease, corresponding to the metacarpophalangeal joint of the finger. A 2.7-mm diameter endoscope was introduced through the proximal incision while a retrograde knife was introduced from the distal incision. Skin suture was done with steri-strips and a moderate compressing dressing was applied. Open surgery: • Under local anaesthesia, with longitudinal incision of 1 cm length made on the volar aspect of the hand, in the palmar crease overlying the metacarpophalangeal joint of the involved digit. The incision was closed in a single layer with 4.0 Vycril and a moderate compressive dressing was applied. **Rehabilitation**: • Post-operative rehabilitation protocol consisted of 2 therapy sessions: 1 on the day after surgery, in which tendon gliding exercises and oedema control were taught, and the other after removal of the dressing, after 7 days for the endoscopic surgery group and after 12 days for the open surgery group. The participants were briefed on how to treat the operative site, with massage of the scar and tendon gliding exercises. Both groups used a dynamic extension splint for the proximal interphalangeal and metacarpophalangeal joints at night for 1 month. **Any co-interventions**: not reported.
Outcomes	**Length of follow-up**: 90 days. Follow-up at 7, 30 and 90 days. The first follow-up was excluded because the dressing still present in open surgery group did not allow a proper evaluation

	Loss of follow-up: none. **Primary outcome**: *Resolution of trigger finger*: considered as the disappearance of triggering after the procedure *Pain*: reported the average postoperative pain duration in days. *Adverse event*: • Infection. • Dysesthesia. *Neurovascular injury.* **Outcomes included in this review**: *Resolution of trigger finger.* *Pain*: reported the average postoperative pain duration in days. *Adverse event*: • Infection. • Dysesthesia. *Neurovascular injury.*
Notes	• Included were participants with carpal tunnel syndrome (28 cases in open surgery group and 12 in endoscopic surgery group), de Quervain's syndrome (4 cases in open surgery group and 2 in endoscopic surgery group) and carpometacarpal joint arthritis (6 cases in open surgery group). • The authors treated trigger finger and others associated pathologies in the same surgical procedure.

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	The method of generating the random sequence was not reported
Allocation concealment (selection bias)	Unclear risk	Not reported.
Blinding of participants and personnel (performance bias) All outcomes	High risk	Participants and personnel were not blinded.
Blinding of outcome assessment (detection bias) - subjective outcomes (e.g. resolution, recurrence, pain, function, satisfaction) All outcomes	High risk	The self-reported subjective outcomes assessors were not blinded
Blinding of outcome assessment (detection bias) - objective outcomes (e.g. adverse events, neurovascular injury) All outcomes	High risk	The objective outcome assessors were not blinded.

Pegoli 2008 (*Continued*)

Incomplete outcome data (attrition bias) All outcomes	Low risk	The authors did not report missing data. All participants received treatment and were followed.
Selective reporting (reporting bias)	High risk	No protocol was published. Pain and functional status of the hand (as primary outcomes, measured by validated instruments) were not evaluated by the authors
Other bias	High risk	There was baseline imbalance. Several participants in both groups had associated pathologies in hand and underwent surgery. In the open surgery group 38% (38/100 participants) had associated pathologies in hand: 28 had carpal tunnel syndrome, 4 had de Quervain's syndrome and 6 rizartroses. In the endoscopic surgery group 14% (14/100 participants) had associated pathologies in hand: 12 had carpal tunnel syndrome and 2 had de Quervain's syndrome

Sato 2012

Methods	**Study design**: randomised controlled trial. **Duration of the study**: November 2002 to March 2007. **Protocol was published before recruitment of patients**: yes. **Details of trial registration**: Current Controlled Trials, www.controlled-trials.com/ ISRCTN19255926 **Funding sources**: the authors have declared no conflicts of interest.
Participants	**Place of study**: Federal University of São Paulo, Brazil. **Number of participants assigned**: 137 participants (150 fingers); 45 percutaneous surgery, 56 open surgery and 49 steroid injection **Number of participants assessed**: 137 participants (150 fingers); 45 percutaneous surgery, 56 open surgery and 49 steroid injection **Inclusion criteria**: • Patients were ≥ 15 years old. • Patients with trigger finger who had not undergone previous treatment of any type and were classified as Quinnell Types II - IV. **Exclusion criteria**: • Individuals with type I trigger fingers. • Congenital trigger fingers.

	• Secondary to the partial lesion to the tendon. **Age**: • Percutaneous surgery (mean): 54.40 years. • Open surgery (mean): 53.4 years. • Steroid injection (mean): 55.29 years. **Gender**: • Percutaneous surgery: 5 male and 40 female. • Open surgery: 10 male and 46 female. • Steroid injection: 3 male and 46 female. **Side**: not reported. **Digits:** 31 thumb, 4 index, 77 long, 35 ring and 3 little. **Classification of injury**: The trigger finger was graded according to Quinnell classification (graded 0 to IV) (Quinnell 1980).
Interventions	**Timing of intervention**: • Percutaneous surgery (mean): 14.96 months. • Open surgery (mean): 10.5 months. • Steroid injection (mean): 11.80 months. **Duration of treatment**: not reported. **Type of intervention**: • Percutaneous surgery consisted of release of the A1 pulley with a 40 × 12 needle, using longitudinal movements, in the direction of the axis of the flexor tendon, and this release was introduced at the site corresponding to the A1 pulley. • Open surgery consisted of an incision of 2 cm in the skin transverse to the axis of the finger at the palmar skin fold, followed by subcutaneous dissection and longitudinal opening of the A1 pulley. • Steroid injection consisted of an injection of 2 ml of methylprednisolone acetate 40 mg/ml at the site corresponding to the A1 pulley, attempting to inject the solution within the osteofibrous canal. **Rehabilitation**: not reported. **Any co-interventions**: not reported.
Outcomes	**Length of follow-up**: 6 months. The patients were prospectively assessed after 1, 2 weeks, 1, 2, 4 and 6 months **Loss of follow-up**: none. **Primary outcomes**: *Resolution of trigger finger (cure)*: the authors considered the remission of symptoms with the cessation of blockage with no recurrence within 6 months *Recurrence of triggering*: the authors defined recurrence (relapse) as the return of finger locking within 6 months of follow-up **Secondary outcomes**: *Topical pain.* *Articular pain.* *Total active motion (TAM) of the fingers.* *Complications (adverse events)*: • Infection. • Tendon injury. *Neurovascular injury.*

	Outcomes included in this review: *Resolution of trigger finger.* *Pain*: assessed through presence or not presence of the pain (topical or articular) in the hand *Recurrence of triggering.* *Adverse event*: • Infection. • Tendon injury. *Neurovascular injury.*
Notes	• For the injection group, all participants received a single injection initially, then a second injection was performed if there was no resolution after the first infiltration. Those that received a second injection were followed for 6 months starting from the second intervention. • In cases in which the patient presented with 2 trigger fingers, each finger received its own order number regardless of whether the fingers were on the same or different hands; 11 patients participated in the study on 2 occasions, and 1 participated on 3 occasions. • After contacting the main author of the study, we were informed about the exact number of thumbs, index, long, ring and little fingers included in each comparison group of the study.

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	The randomisation was done by means of a 6-sided die with 2 sides representing 1 of the 3 treatments. The draw was conducted before the study by a person independent of the research
Allocation concealment (selection bias)	Low risk	The result of each draw was placed in an opaque envelope, which was then sealed; envelopes were numbered from 1 to 150. None of the project participants had prior access to the envelope contents
Blinding of participants and personnel (performance bias) All outcomes	High risk	Participants and personnel were not blinded.
Blinding of outcome assessment (detection bias) - subjective outcomes (e.g. resolution, recurrence, pain, function, satisfaction) All outcomes	High risk	The self-reported subjective outcomes assessors were not blinded

Sato 2012 (*Continued*)

Blinding of outcome assessment (detection bias) - objective outcomes (e.g. adverse events, neurovascular injury) All outcomes	High risk	The objective outcome assessors were not blinded.
Incomplete outcome data (attrition bias) All outcomes	Low risk	The authors did not report missing data. All participants received treatment and were followed.
Selective reporting (reporting bias)	Unclear risk	Although results were evaluated and explained according to previous protocol published in October 2010, the study started in November 2002 and finished in March 2007
Other bias	Unclear risk	There was no baseline imbalance or differences in care providers, but the authors did not describe rehabilitation

Singh 2005

Methods	**Study design**: quasi-randomised controlled trial. **Duration of the study**: from January 2005 to June 2005. **Protocol was published before recruitment of patients**: not reported. **Details of trial registration**: not registered. **Funding sources**: none known.
Participants	**Place of study**: Penang General Hospital, Malaysia. **Number of participants assigned**: 26 participants (26 fingers); 14 percutaneous surgery and 12 steroid injection **Number of participants assessed**: 26 participants (26 fingers); 14 percutaneous surgery and 12 steroid injection **Inclusion criteria**: • Participants who presented with grade II or III trigger digit as classified by Quinnell. **Exclusion criteria**: • Participants with trigger thumbs were excluded. **Age**: • Total of participants (mean): 57 years. **Gender**: • Total of participants: 9 male; 17 female. **Side**: • Total of participants: 14 dominant hand and 12 non-dominant hand. **Digits**: • Total of participants: 4 index, 11 long and 11 ring. There was no involvement of the little finger. **Classification of injury**: The trigger finger was graded according to Quinnell classification (graded 0 to IV)

	(Quinnell 1980).
Interventions	**Timing of intervention**: not reported. **Duration of treatment**: not reported. **Type of intervention**: • Percutaneous surgery: after 1m of lidocaine 1% was infiltrated around A1 pulley, a 20-gauge needle was inserted with the sharp bevel parallel to the tendon, in position correlating with the middle of the A1 pulley. The needle was stroked longitudinally, proximally and distally to transect the A1 pulley. • Steroid injection: after 1m of lidocaine 1% was infiltrated around A1 pulley, was injected 1 mL of triamcinolone mixed with 1 mL of 1% lidocaine into the tendon sheath and around the nodule. **Rehabilitation**: the authors did not clearly describe if all study participants did physiotherapy. They reported that in percutaneous surgery group 2 participants developed stiffness of digit which responded to aggressive physiotherapy **Any co-interventions**: analgesia was given for 3 days in steroid injection group.
Outcomes	**Length of follow-up**: • Follow-up was 1 year. • Participants were evaluated weekly for 1 month and 3-monthly for a year. **Loss of follow-up**: not reported. **Primary outcomes**: *Pain.* *Patient satisfaction.* *Recurrence of triggering*: the authors did not clearly define what they considered recurrence *Adverse events*: • Partial loss of movement. • Dysaesthesia. • Pulley or tendon injury. **Outcomes included in this review**: *Pain.* *Patient satisfaction.* *Recurrence of triggering* *Adverse events*: • Partial loss of movement. • Dysaesthesia. • Pulley or tendon injury.
Notes	• Pain and patient satisfaction were described incompletely (no numerical data was reported), and we were unable to include these data in the results. • We tried unsuccessfully to contact the authors to obtain further information on pain.

Risk of bias

Bias	Authors' judgement	Support for judgement

Singh 2005 (*Continued*)

Random sequence generation (selection bias)	High risk	Quasi-randomised controlled trial. Patients were randomised to either steroid injection or percutaneous surgery using their birth year. Those with even numbers were allocated to the steroid group and uneven numbers to the percutaneous group
Allocation concealment (selection bias)	High risk	Quasi-randomised controlled trial.
Blinding of participants and personnel (performance bias) All outcomes	High risk	Participants and personnel were not blinded.
Blinding of outcome assessment (detection bias) - subjective outcomes (e.g. resolution, recurrence, pain, function, satisfaction) All outcomes	High risk	The self-reported subjective outcomes assessors were not blinded
Blinding of outcome assessment (detection bias) - objective outcomes (e.g. adverse events, neurovascular injury) All outcomes	High risk	The objective outcome assessors were not blinded.
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Not reported.
Selective reporting (reporting bias)	High risk	No protocol was published. Outcomes of interest in the review (resolution of trigger finger and functional status of the hand) were not reported. Pain was reported incompletely, without numerical values
Other bias	Unclear risk	The authors did not report data about baseline balance, and they did not clearly report about care providers and rehabilitation

Zyluk 2011

Methods	**Study design**: randomised controlled trial. **Duration of the study**: January 2008 to May 2009. **Protocol was published before recruitment of patients**: not reported. **Details of trial registration**: not reported. **Funding sources**: none declared.
Participants	**Place of study**: Pomeranian Medical University in Szczecin, Poland. **Number of participants assigned**: 115 participants. **Number of participants assessed**: 95 participants (105 digits); 43 participants (46

	digits) percutaneous surgery and 52 participants (59 digits) steroid injection **Inclusion criteria**: participants with trigger digits. **Exclusion criteria**: not reported. **Age**: • Percutaneous surgery (mean): 55 years. • Steroid injection (mean): 58 years. **Gender**: • Percutaneous surgery: 27 female and 16 male. • Steroid injection: 40 female and 12 male. **Side**: • Percutaneous surgery: 24 left and 19 right. • Steroid injection: 34 left and 18 right. **Digits:** • Total of digits assessed: 39 thumb, 1 index, 22 long, 35 ring and 8 little. **Classification of injury**: Trigger fingers were graded according to Froimson's modification of Quinnell's classification (graded I to IV) (Froimson 1993).
Interventions	**Timing of intervention**: • Percutaneous surgery (mean): 5 months. • Steroid injection (mean): 6 months. **Duration of treatment**: not reported. **Type of intervention**: • Percutaneous A1 pulley release was performed in the outpatient clinic, using a 19 gauge hypodermic needle, after preparation of the skin and injection of 1 ml 2% plain lidocaine. • The steroid injection of 1 ml of betamethasone into the flexor tendon sheath was also performed in the outpatient clinic. **Rehabilitation**: not reported. **Any co-interventions**: not reported.
Outcomes	**Length of follow-up**: 6 months (at 1 and 6 months). **Loss of follow-up**: 20 participants (12 in the percutaneous surgery group and 8 in the steroid injection group) **Primary outcomes**: *Pain*: measured by Visual Analog Scale (VAS: 0 to 10 scale). *Active range of motion (AROM) of the affected digit.* *Total grip strength*: expressed as a proportion of the strength of the contralateral, healthy hand *Recurrence of triggering*: considered as the return to the baseline grade, after a period of total or partial improvement of the trigger finger *Adverse event*: • Partial loss of movement. • Neurovascular injury. **Outcomes included in this review**: *Pain*: measured by Visual Analog Scale (VAS: 0 to 10 scale). *Recurrence of triggering.*

	Adverse event: • Partial loss of movement. *Neurovascular injury.*
Notes	• The authors reported pain, adverse events and neurovascular injury incompletely. They did not report standard deviations on VAS score, and they reported that infection, algodystrophic syndrome and neurovascular injury did not occur in the steroid injection group, but did not mention whether these adverse events occurred in the percutaneous surgery group. • Twenty of 115 patients (17%) who were recruited did not attend follow-up (12 in the group treated operatively and 8 in the group treated by injection). • We tried unsuccessfully to contact the authors to obtain further information on standard deviations for pain (VAS-score), and missing data on adverse events and neurovascular injury; asked also for further information on total patients' fingers lost to follow-up. In analysis we used the same standard deviation reported by Chao 2009 for pain (VAS-score), as foreseen in our protocol Ventin 2014.

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Patients were randomly assigned to the groups by drawing slips of paper marked 1 (percutaneous release) or 2 (steroid injection) from a sealed envelope in the presence of a witness
Allocation concealment (selection bias)	Low risk	Sealed envelopes were used.
Blinding of participants and personnel (performance bias) All outcomes	High risk	Participants and personnel were not blinded.
Blinding of outcome assessment (detection bias) - subjective outcomes (e.g. resolution, recurrence, pain, function, satisfaction) All outcomes	Low risk	The self-reported subjective outcomes assessors were blinded
Blinding of outcome assessment (detection bias) - objective outcomes (e.g. adverse events, neurovascular injury) All outcomes	Low risk	The objective outcome assessors were blinded.
Incomplete outcome data (attrition bias) All outcomes	High risk	20 of 115 patients (17%) who were recruited did not attend follow-up and were excluded (12 participants in the percutaneous surgery group and 8 in the steroid injection group). The authors did not describe how many fingers were affected in

Zyluk 2011 (*Continued*)

		these 20 patients
Selective reporting (reporting bias)	High risk	No protocol was published. Outcomes of interest in the review (resolution of trigger finger and functional status of the hand) were not reported. Pain was reported incompletely, without any measure of variance for the validated instruments (VAS)
Other bias	Unclear risk	There was no baseline imbalance and no risk of bias was associated with care providers, but the author did not report about rehabilitation

Characteristics of excluded studies *[ordered by study ID]*

Study	Reason for exclusion
Abe 2016	Design of study not relevant: not a randomised or quasi-randomised controlled trial
Benson 1997	Design of study not relevant: retrospective comparative study
Durand 2011	Design of study not relevant: narrative review.
Guler 2013	Design of study not relevant: retrospective comparative study
Kolind-Sorensen 1970	Design of study not relevant: not a randomised or quasi-randomised controlled trial
Lin 2016	Design of study not relevant: retrospective comparative study
Liu 2016	Intervention is steroid injection plus percutaneous surgery versus percutaneous surgery alone
NCT01781130	Intervention is steroid injection plus percutaneous surgery versus percutaneous surgery alone
Patel 1992	Design of study not relevant: not a randomised or quasi-randomised controlled trial
Patel 1997	Design of study not relevant: not a randomised or quasi-randomised controlled trial
Paul 1992	Design of study not relevant: not a randomised or quasi-randomised controlled trial
Rojo-Manaute 2012a	Design of study not relevant: not a randomised or quasi-randomised controlled trial

(*Continued*)

Rojo-Manaute 2012b	This study was not included because none of the outcomes of interest in this review (resolution of trigger finger, severity of pain or tenderness at the base of the digit on the palm of the hand, functional status of the hand, participant-reported treatment success or satisfaction, frequency of recurrence of triggering, number of patients experiencing any adverse event or neurovascular injury) were assessed. The authors defined a surgical model as the combination of a procedure (sonographically guided, wide awake, or classic) and a setting (day surgery or office-based), and they assessed the outcomes turnover analysis and economic analysis for each model
Topper 1997	Although the author randomised 3 different surgical treatments in trigger finger initially (surgical release of the third proximal, middle and distal pulley A1), there was intraoperative change in all patients after it was observed that the partial release of one-third pulley A1 was not curative treatment for trigger finger. So the authors chose to perform the complete open release of the A1 pulley in all cases. Thus, it was not characterized a randomised clinical trial
Uçar 2012	Design of study not relevant: not a randomised or quasi-randomised controlled trial

Characteristics of ongoing studies *[ordered by year of study]*

NTR1135

Trial name or title	The efficacy of Trigger Finger treatment: a randomised, controlled, prospective clinical multicentre trial
Methods	**Study design**: randomized controlled trial. **Random sequence generation**: not reported. **Allocation concealment**: not reported. **Masking**: open label.
Participants	**Location**: plastic surgery outpatient clinic in the UMC Utrecht, The Hand Clinic Amsterdam, Diakonessenhuis Zeist, the Mesos Medical Center Utrecht, the St. Antonius Hospital Nieuwegein, the Zuwe Hofpoort Hospital Woerden and the Meander Medical Center Amersfoort**,** the Netherlands. **Target sample size (N)**: 490 participants. **Inclusion criteria**: adults with trigger finger. **Exclusion criteria**: • Incapacitated patients • Patients less than 18 years of age; • Women who would like to become pregnant during the period of the trial; • Pregnant women; • Lactating women.
Interventions	**Type of surgical intervention**: open surgery. **Type of conservative intervention**: local corticosteroid injections (triamcinolone acetonide).
Outcomes	**Primary outcomes**: • Success of the treatment. • Pain. **Secondary outcomes**: • The complications which occur after treatment.

NTR1135 (*Continued*)

	Timing of outcomes measurement: not reported.
Starting date	**Main ID**: NTR1135 **Date of registration**: 18 November 2007. **Last refreshed on**: 30 April 2017. **Date of first enrolment**: 1 January 2008. **Status**: recruiting. **Estimated Study Completion date**: January 2011.
Contact information	**Name**: A.S.E. Esschendal. **Address**: Postbus 85500 , Secretariaat Plastische Chirurgie UMC Utrecht kamer G04.122 Utrecht, the Netherlands **Telephone**: +31 30 250 6954 **Email**: Eva_Esschendal@hotmail.com **Affiliation**: not reported.
Notes	

TCTR20150416001

Trial name or title	A1-Pulley release using open conventional technique or percutaneously with a modified Kirschner wire: a prospective randomised-controlled trial
Methods	**Study design**: randomised controlled trial. **Random sequence generation**: not reported. **Allocation concealment**: not reported. **Masking**: open label.
Participants	**Location**: Department of Orthopedics, Faculty of Medicine, Khonkaen University, Thailand **Target sample size (N)**: 51 participants. **Inclusion criteria**: • Patients who had failed non-operative treatment of the trigger digits. • Age minimum: 18 years. • Age maximum: 70 years. • Gender: both. **Exclusion criteria**: • Congenital trigger digits. • Secondary trigger digits from underlying causes • Rheumatoid arthritis. • Patients who had previous surgery in the palm.
Interventions	**Type of surgical intervention**: open surgery. **Type of conservative intervention**: percutaneous release by using a modified Kirschner wire.
Outcomes	**Primary outcomes**: time to return to work. **Secondary outcomes**: pain score. **Timing of outcomes measurement**: 1 year.

TCTR20150416001 (*Continued*)

Starting date	**Main ID**: TCTR20150416001. **Date of registration**: 16 April 2015. **Last refreshed on**: 11 September 2017. **Date of first enrolment**: 16 April 2015. **Status**: recruiting. **Estimated Study Completion date**: 31 December 2016.
Contact information	**Name**: Surut Jianmongkol, M.D. **Address**: Department of Orthopedics, Faculty of Medicine, Khonkaen University Khonkaen 40002 Thailand **Telephone**: 6643348398 **Email**: surutmd@yahoo.com **Affiliation**: not reported.
Notes	

TCTR20140529001

Trial name or title	Percutaneous trigger finger release, probe knife compared with 18-gauge needle : A randomized control trial
Methods	**Study design**: randomised controlled trial. **Random sequence generation**: not reported. **Allocation concealment**: not reported. **Masking**: single blind (masked roles: outcomes assessor).
Participants	**Location**: Songklanakarin Hospital, Thailand. **Target sample size (N)**: 128 participants. **Inclusion criteria**: • Painful triggering finger. • Locking finger. • Age minimum: 30 years. • Age maximum: 80 years. • Gender: both. **Exclusion criteria**: • Previous hand disease and hand injury
Interventions	**Type of surgical intervention**: percutaneous release with needle. **Type of surgical intervention**: percutaneous release with probe scalpel.
Outcomes	**Primary outcomes**: • Post-operative pain (VAS score). **Secondary outcomes**: • Operative time. • Time return to work. • Adverse events. • Patient satisfaction. • Pinch strength (metric/method of measurement: Questionnaire, tip pinch gauge). **Timing of outcomes measurement**: not reported.

TCTR20140529001 (*Continued*)

Starting date	**Main ID**: TCTR20140529001 **Date of registration**: May 29, 2014. **Last refreshed on**: September 11, 2017. **Date of first enrolment**: May 30, 2014. **Status**: Active, not recruiting. **Estimated Study Completion date**: not reported.
Contact information	**Name**: Sittichoke Anuntaseree, M.D. **Address**: Songklanakarin Hospital, Hat Yai 90110 Thailand. **Telephone**: 66869691017 **Email**: asittich@medicine.psu.ac.th **Affiliation**: Faculty of Medicine, PSU.
Notes	

DATA AND ANALYSES

Comparison 1. Open surgery versus steroid injection

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Resolution of trigger finger	2		Risk Ratio (M-H, Random, 95% CI)	Subtotals only
1.1 Resolution of symptoms after one or more injections (six to 12 months)	2	270	Risk Ratio (M-H, Random, 95% CI)	1.48 [0.79, 2.76]
2 Pain on the palm of the hand	1		Risk Ratio (M-H, Random, 95% CI)	Subtotals only
2.1 Pain short-term (one week)	1	105	Risk Ratio (M-H, Random, 95% CI)	3.69 [1.99, 6.85]
2.2 Pain intermediate-term (six months)	1	105	Risk Ratio (M-H, Random, 95% CI)	0.10 [0.01, 1.77]
3 Pain (1 to 10 scale)	1		Mean Difference (IV, Random, 95% CI)	Subtotals only
3.1 Pain short-term (three months)	1	156	Mean Difference (IV, Random, 95% CI)	0.0 [-0.23, 0.23]
3.2 Pain long-term (12 months)	1	153	Mean Difference (IV, Random, 95% CI)	-2.0 [-2.68, -1.32]
4 Frequency of recurrence	2		Risk Ratio (M-H, Random, 95% CI)	Subtotals only
4.1 Recurrence (range six to 12 months)	2	270	Risk Ratio (M-H, Random, 95% CI)	0.17 [0.09, 0.33]
5 Adverse events	2		Risk Ratio (M-H, Random, 95% CI)	Subtotals only
5.1 Infection	2	270	Risk Ratio (M-H, Random, 95% CI)	2.65 [0.88, 7.99]
5.2 Tendon or pulley injury	1	105	Risk Ratio (M-H, Random, 95% CI)	0.0 [0.0, 0.0]
5.3 Flare around procedure site	1	165	Risk Ratio (M-H, Random, 95% CI)	0.51 [0.23, 1.15]
5.4 Cutaneous discomfort around procedure site (after 12 months)	1	165	Risk Ratio (M-H, Random, 95% CI)	3.62 [1.25, 10.44]
5.5 Fat necrosis at the procedure site	1	165	Risk Ratio (M-H, Random, 95% CI)	1.29 [0.47, 3.54]
5.6 Total adverse events	2	270	Risk Ratio (M-H, Random, 95% CI)	1.02 [0.57, 1.84]
6 Neurovascular injury	2		Risk Ratio (M-H, Random, 95% CI)	Subtotals only
6.1 Neurovascular injury	2	270	Risk Ratio (M-H, Random, 95% CI)	2.17 [0.70, 6.77]
7 Subgroup analyses for resolution	2		Risk Ratio (M-H, Random, 95% CI)	Subtotals only
7.1 Resolution short-term	1	165	Risk Ratio (M-H, Random, 95% CI)	1.08 [0.96, 1.21]
7.2 Resolution intermediate-term	1	105	Risk Ratio (M-H, Random, 95% CI)	1.17 [1.04, 1.31]
7.3 Resolution long-term	1	165	Risk Ratio (M-H, Random, 95% CI)	1.90 [1.49, 2.43]
8 Subgroup analyses for recurrence	2		Risk Ratio (M-H, Random, 95% CI)	Subtotals only
8.1 Recurrence intermediate-term (six months)	1	105	Risk Ratio (M-H, Random, 95% CI)	0.06 [0.00, 1.00]
8.2 Recurrence long-term (12 months)	1	165	Risk Ratio (M-H, Random, 95% CI)	0.18 [0.09, 0.36]

Comparison 2. Percutaneous surgery versus steroid injection

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Resolution of trigger finger	2		Risk Ratio (M-H, Random, 95% CI)	Subtotals only
1.1 Resolution of symptoms after one or more injections (six to 12 months)	2	191	Risk Ratio (M-H, Random, 95% CI)	2.11 [0.31, 14.51]
2 Pain (VAS: 0 to 10 scale)	2		Mean Difference (IV, Random, 95% CI)	Subtotals only
2.1 Pain short-term (one month)	2	198	Mean Difference (IV, Random, 95% CI)	-1.80 [-5.72, 2.12]
2.2 Pain long-term (12 months)	1	93	Mean Difference (IV, Random, 95% CI)	-6.5 [-7.25, -5.75]
3 Pain on the palm of the hand	1		Risk Ratio (M-H, Random, 95% CI)	Subtotals only
3.1 Pain short-term (one week)	1	94	Risk Ratio (M-H, Random, 95% CI)	3.63 [1.94, 6.78]
3.2 Pain intermediate-term (six months)	1	94	Risk Ratio (M-H, Random, 95% CI)	0.12 [0.01, 2.18]
4 Frequency of recurrence	5		Risk Ratio (M-H, Random, 95% CI)	Subtotals only
4.1 Recurrence (range six to 12 months)	5	392	Risk Ratio (M-H, Random, 95% CI)	0.57 [0.21, 1.59]
5 Adverse events	5		Risk Ratio (M-H, Random, 95% CI)	Subtotals only
5.1 Infection	2	191	Risk Ratio (M-H, Random, 95% CI)	0.35 [0.04, 3.29]
5.2 Partial loss of movement	3	201	Risk Ratio (M-H, Random, 95% CI)	3.09 [0.87, 10.97]
5.3 Tendon or pulley injury	4	267	Risk Ratio (M-H, Random, 95% CI)	1.00 [0.21, 4.81]
5.4 Dysaesthesia	2	76	Risk Ratio (M-H, Random, 95% CI)	0.20 [0.02, 1.67]
5.5 Skin atrophy or hypopigmentation	1	50	Risk Ratio (M-H, Random, 95% CI)	0.14 [0.01, 2.63]
5.6 Total adverse events	5	392	Risk Ratio (M-H, Random, 95% CI)	1.58 [0.91, 2.75]
6 Neurovascular injury	2		Risk Ratio (M-H, Random, 95% CI)	Subtotals only
6.1 Neurovascular injury	2	191	Risk Ratio (M-H, Random, 95% CI)	0.35 [0.04, 3.29]
7 Subgroup analyses for resolution	2		Risk Ratio (M-H, Random, 95% CI)	Subtotals only
7.1 Resolution short-term	1	97	Risk Ratio (M-H, Random, 95% CI)	2.18 [1.55, 3.05]
7.2 Resolution intermediate-term	1	94	Risk Ratio (M-H, Random, 95% CI)	1.16 [1.03, 1.31]
7.3 Resolution long-term	1	97	Risk Ratio (M-H, Random, 95% CI)	3.90 [2.37, 6.42]
8 Subgroup analyses for recurrence	5		Risk Ratio (M-H, Random, 95% CI)	Subtotals only
8.1 Recurrence short-term (one month)	1	125	Risk Ratio (M-H, Random, 95% CI)	1.73 [0.76, 3.94]
8.2 Recurrence intermediate-term (six months)	2	219	Risk Ratio (M-H, Random, 95% CI)	0.37 [0.02, 5.50]
8.3 Recurrence long-term (range nine to 12 months)	3	173	Risk Ratio (M-H, Random, 95% CI)	0.55 [0.10, 2.99]

Comparison 3. Open surgery versus steroid injection plus hyaluronic acid injection guided by ultrasound

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Resolution of trigger finger	1		Risk Ratio (M-H, Random, 95% CI)	Subtotals only
1.1 Resolution of symptoms long-term (12 months)	1	30	Risk Ratio (M-H, Random, 95% CI)	1.35 [0.98, 1.85]
1.2 Resolution of symptoms intermediate-term (six month)	1	30	Risk Ratio (M-H, Random, 95% CI)	1.07 [0.89, 1.28]
2 Frequency of recurrence	1		Risk Ratio (M-H, Random, 95% CI)	Subtotals only
2.1 Recurrence long-term (12 months)	1	30	Risk Ratio (M-H, Random, 95% CI)	0.14 [0.01, 2.55]
2.2 Recurrence intermediate-term (six months)	1	30	Risk Ratio (M-H, Random, 95% CI)	0.0 [0.0, 0.0]
3 Adverse events	1		Risk Ratio (M-H, Random, 95% CI)	Subtotals only
3.1 Partial loss of movement	1	30	Risk Ratio (M-H, Random, 95% CI)	2.0 [0.20, 19.78]
3.2 Algodystrophic syndrome	1	30	Risk Ratio (M-H, Random, 95% CI)	3.0 [0.13, 68.26]
3.3 Total adverse events	1	30	Risk Ratio (M-H, Random, 95% CI)	3.0 [0.35, 25.68]

Comparison 4. Percutaneous surgery plus steroid injection versus steroid injection

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Resolution of trigger finger	1		Risk Ratio (M-H, Random, 95% CI)	Subtotals only
1.1 Resolution of symptoms after one or more injections (range 6 to 42 months)	1	127	Risk Ratio (M-H, Random, 95% CI)	1.51 [1.21, 1.90]
2 Adverse events	1		Risk Ratio (M-H, Random, 95% CI)	Subtotals only
2.1 Infection	1	127	Risk Ratio (M-H, Random, 95% CI)	0.46 [0.04, 4.97]
2.2 Partial loss of movement	1	127	Risk Ratio (M-H, Random, 95% CI)	1.85 [0.17, 19.87]
2.3 Total adverse events	1	127	Risk Ratio (M-H, Random, 95% CI)	0.92 [0.13, 6.36]
3 Neurovascular injury	1		Risk Ratio (M-H, Random, 95% CI)	Subtotals only
3.1 Neurovascular injury	1	127	Risk Ratio (M-H, Random, 95% CI)	0.92 [0.06, 14.46]

Comparison 5. Percutaneous surgery versus open surgery

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Resolution of trigger finger	5		Risk Ratio (M-H, Random, 95% CI)	Subtotals only
1.1 Resolution of symptoms (range 2 to 6 months)	5	429	Risk Ratio (M-H, Random, 95% CI)	1.00 [0.97, 1.02]
2 Pain (1 to 6 scale)	1		Mean Difference (IV, Random, 95% CI)	Subtotals only
2.1 Pain short-term (1 week)	1	36	Mean Difference (IV, Random, 95% CI)	0.30 [-0.34, 0.94]

2.2 Pain short-term (12 weeks)	1	36	Mean Difference (IV, Random, 95% CI)	0.0 [-0.52, 0.52]
3 Pain on the palm of the hand	1		Risk Ratio (M-H, Random, 95% CI)	Subtotals only
3.1 Pain short-term (one week)	1	101	Risk Ratio (M-H, Random, 95% CI)	0.98 [0.75, 1.29]
3.2 Pain intermediate-term (six months)	1	101	Risk Ratio (M-H, Random, 95% CI)	0.0 [0.0, 0.0]
4 Frequency of recurrence	4		Risk Ratio (M-H, Random, 95% CI)	Subtotals only
4.1 Recurrence (range 2 to 6 months)	4	397	Risk Ratio (M-H, Random, 95% CI)	0.28 [0.01, 6.83]
5 Adverse events	5		Risk Ratio (M-H, Random, 95% CI)	Subtotals only
5.1 Infection	2	133	Risk Ratio (M-H, Random, 95% CI)	0.0 [0.0, 0.0]
5.2 Partial loss of movement	1	32	Risk Ratio (M-H, Random, 95% CI)	0.0 [0.0, 0.0]
5.3 Tendon or pulley injury	2	261	Risk Ratio (M-H, Random, 95% CI)	0.0 [0.0, 0.0]
5.4 Edema or inflammation or hematoma	2	136	Risk Ratio (M-H, Random, 95% CI)	0.80 [0.12, 5.30]
5.5 Adherence	1	100	Risk Ratio (M-H, Random, 95% CI)	0.28 [0.01, 6.83]
5.6 Others (it did not specified)	1	100	Risk Ratio (M-H, Random, 95% CI)	2.56 [0.11, 61.45]
5.7 Total adverse events	5	429	Risk Ratio (M-H, Random, 95% CI)	0.80 [0.17, 3.68]
6 Subgroup analyses for resolution	5		Risk Ratio (M-H, Random, 95% CI)	Subtotals only
6.1 Resolution of symptoms (short-term)	4	328	Risk Ratio (M-H, Random, 95% CI)	1.00 [0.97, 1.02]
6.2 Resolution of symptoms (intermediate-term)	1	101	Risk Ratio (M-H, Random, 95% CI)	1.0 [0.96, 1.04]
7 Subgroup analyses for recurrence	4		Risk Ratio (M-H, Random, 95% CI)	Subtotals only
7.1 Recurrence short-term (eight to 12 weeks)	3	296	Risk Ratio (M-H, Random, 95% CI)	0.28 [0.01, 6.83]
7.2 Recurrence intermediate-term (six months)	1	101	Risk Ratio (M-H, Random, 95% CI)	0.0 [0.0, 0.0]

Comparison 6. Endoscopic surgery versus open surgery

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Resolution of trigger finger	1		Risk Ratio (M-H, Random, 95% CI)	Subtotals only
1.1 Resolution of symptoms (three months)	1	231	Risk Ratio (M-H, Random, 95% CI)	1.0 [0.98, 1.02]
2 Adverse events	1		Risk Ratio (M-H, Random, 95% CI)	Subtotals only
2.1 Infection	1	231	Risk Ratio (M-H, Random, 95% CI)	0.0 [0.0, 0.0]
2.2 Dysesthesia	1	231	Risk Ratio (M-H, Random, 95% CI)	2.74 [0.74, 10.06]
2.3 Total adverse events	1	231	Risk Ratio (M-H, Random, 95% CI)	2.74 [0.74, 10.06]
3 Neurovascular injury	1		Risk Ratio (M-H, Random, 95% CI)	Subtotals only
3.1 Neurovascular injury	1	231	Risk Ratio (M-H, Random, 95% CI)	3.08 [0.13, 74.79]

Comparison 7. Open surgery by transverse incision of the skin about 2-3 mm distally from distal palmar crease versus open surgery by longitudinal incision of the skin

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 DASH score	1		Mean Difference (IV, Random, 95% CI)	Subtotals only
1.1 DASH score short-term (one month)	1	21	Mean Difference (IV, Random, 95% CI)	-1.5 [-19.19, 16.19]
1.2 DASH score short-term (three months)	1	21	Mean Difference (IV, Random, 95% CI)	-2.0 [-16.45, 12.45]
1.3 DASH score long-term (12 months)	1	21	Mean Difference (IV, Random, 95% CI)	-8.9 [-23.35, 5.55]

Comparison 8. Open surgery by transverse incision of the skin in the distal palmar crease versus open surgery by longitudinal incision of the skin

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 DASH score	1		Mean Difference (IV, Random, 95% CI)	Subtotals only
1.1 DASH score short-term (one month)	1	22	Mean Difference (IV, Random, 95% CI)	5.20 [-16.67, 27.07]
1.2 DASH score short-term (three months)	1	22	Mean Difference (IV, Random, 95% CI)	1.60 [-15.27, 18.47]
1.3 DASH score long-term (12 months)	1	22	Mean Difference (IV, Random, 95% CI)	3.10 [-21.28, 27.48]

Comparison 9. Open surgery by transverse incision of the skin in the distal palmar crease versus open surgery by transverse incision of the skin about 2-3 mm distally from distal palmar crease

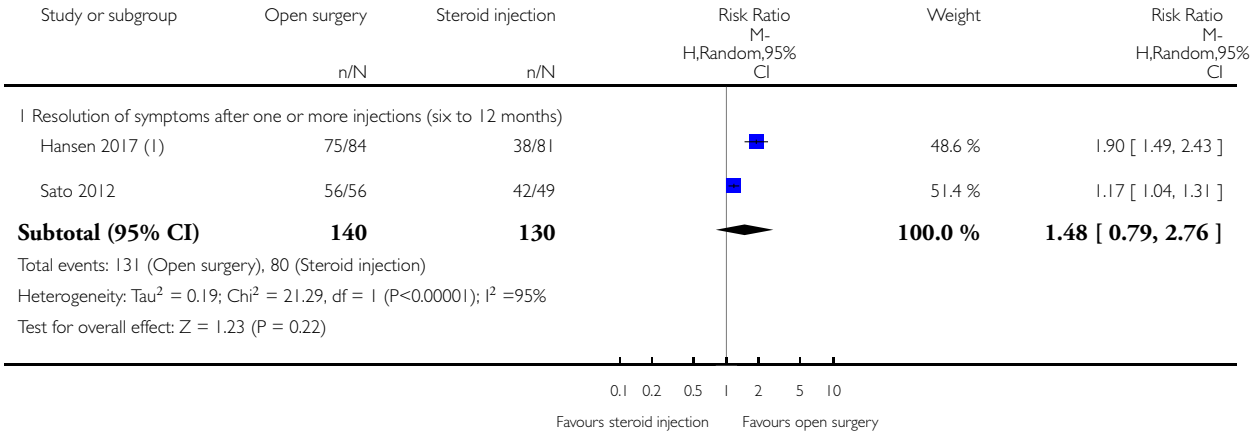
Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 DASH score	1		Mean Difference (IV, Random, 95% CI)	Subtotals only
1.1 DASH score short-term (one month)	1	21	Mean Difference (IV, Random, 95% CI)	6.70 [-13.67, 27.07]
1.2 DASH score short-term (three months)	1	21	Mean Difference (IV, Random, 95% CI)	3.60 [-12.84, 20.04]
1.3 DASH score long-term (12 months)	1	21	Mean Difference (IV, Random, 95% CI)	12.00 [-8.84, 32.84]

Analysis 1.1. Comparison 1 Open surgery versus steroid injection, Outcome 1 Resolution of trigger finger.

Review: Surgery for trigger finger

Comparison: 1 Open surgery versus steroid injection

Outcome: 1 Resolution of trigger finger



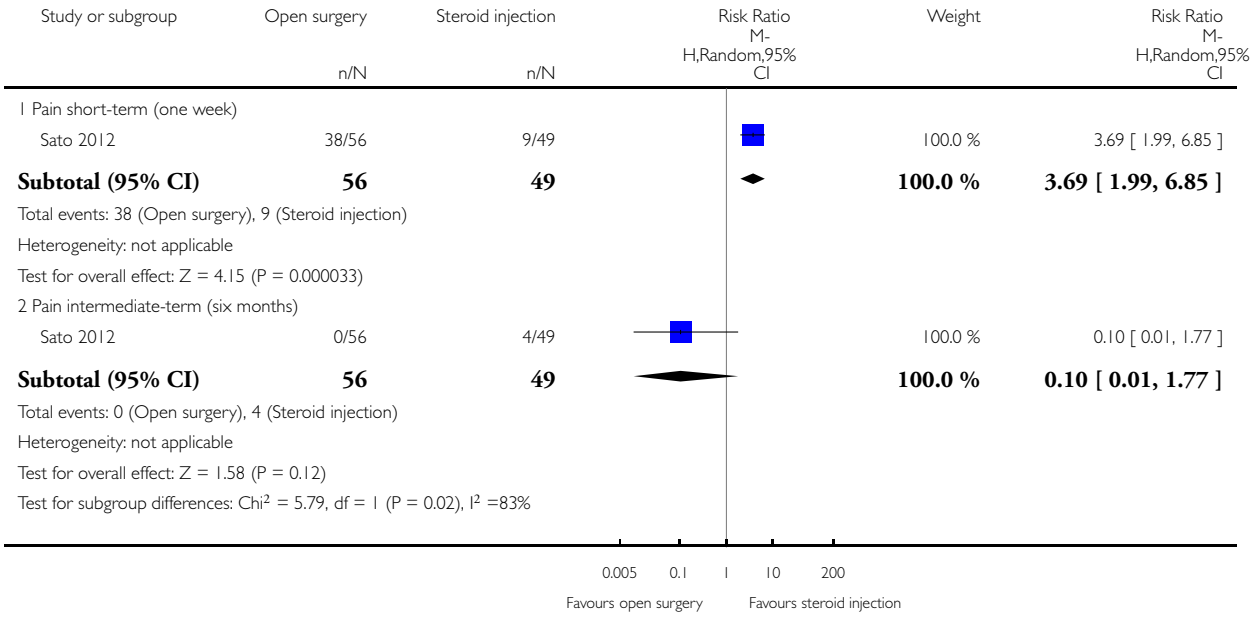
(1) There was follow-up loss in this trial; eight participants in open surgery group and four participants in steroid injection group were follow-up loss and we assumed they did not have a positive outcome.

Analysis 1.2. Comparison 1 Open surgery versus steroid injection, Outcome 2 Pain on the palm of the hand.

Review: Surgery for trigger finger

Comparison: 1 Open surgery versus steroid injection

Outcome: 2 Pain on the palm of the hand

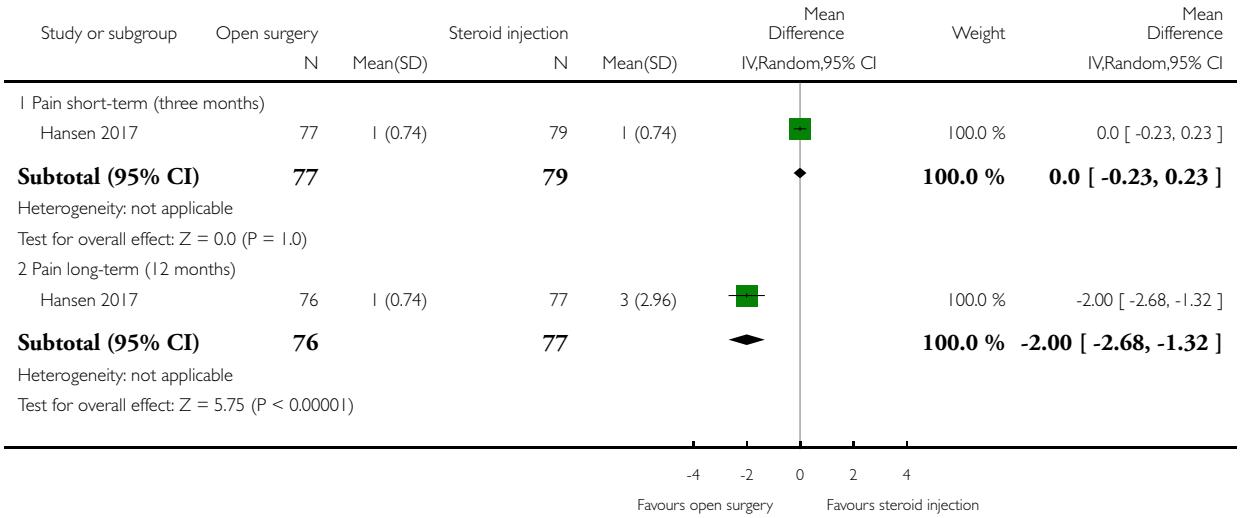


Analysis 1.3. Comparison 1 Open surgery versus steroid injection, Outcome 3 Pain (1 to 10 scale).

Review: Surgery for trigger finger

Comparison: 1 Open surgery versus steroid injection

Outcome: 3 Pain (1 to 10 scale)

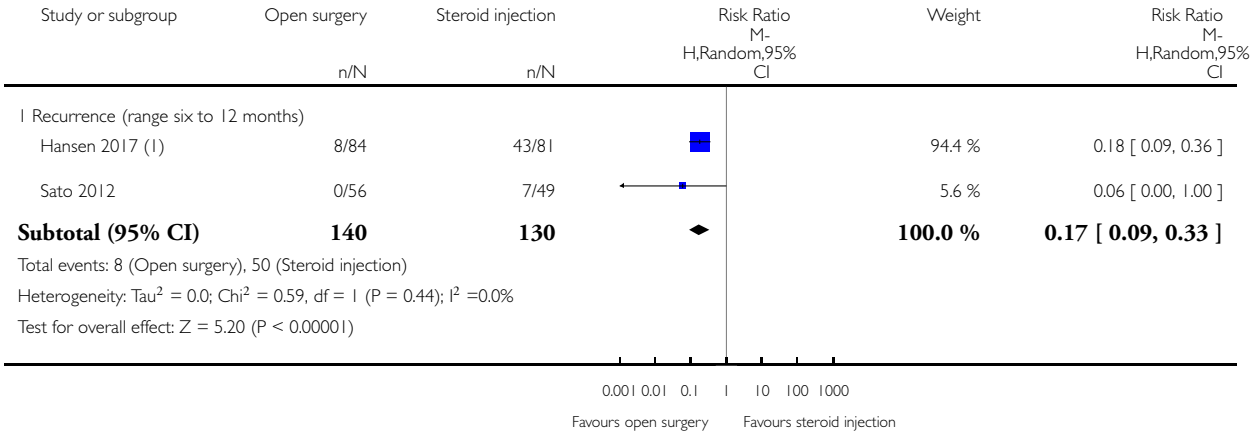


Analysis 1.4. Comparison 1 Open surgery versus steroid injection, Outcome 4 Frequency of recurrence.

Review: Surgery for trigger finger

Comparison: 1 Open surgery versus steroid injection

Outcome: 4 Frequency of recurrence



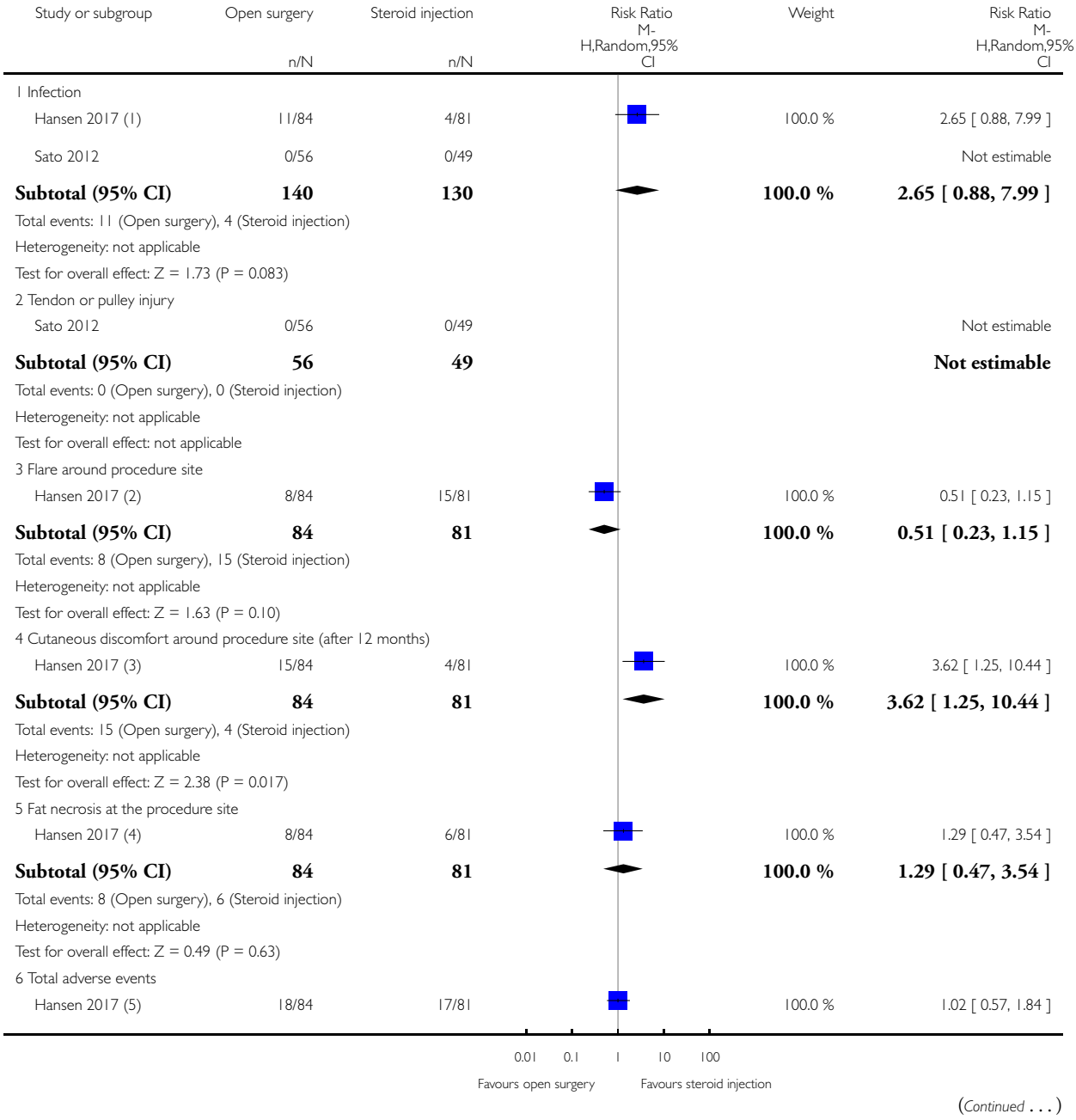
(1) There was follow-up loss in this trial; eight participants in open surgery group and four participants in steroid injection group were follow-up loss and we assumed they had recurrence.

Analysis 1.5. Comparison 1 Open surgery versus steroid injection, Outcome 5 Adverse events.

Review: Surgery for trigger finger

Comparison: 1 Open surgery versus steroid injection

Outcome: 5 Adverse events



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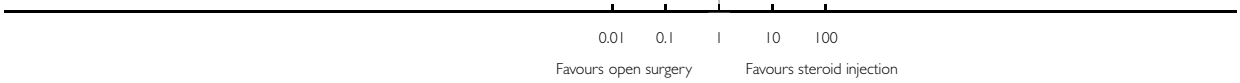
Study or subgroup	Open surgery n/N	Steroid injection n/N	Risk Ratio M-H,Random,95% CI	Weight	Risk Ratio M-H,Random,95% CI
Sato 2012	0/56	0/49			Not estimable
Subtotal (95% CI)	**140**	**130**		**100.0 %**	**1.02 [0.57, 1.84]**
Total events: 18 (Open surgery), 17 (Steroid injection)					
Heterogeneity: not applicable					
Test for overall effect: Z = 0.07 (P = 0.94)					



(1) There was follow-up loss in this trial; eight participants in open surgery group and four participants in steroid injection group were follow-up loss and we assumed they had an adverse event.

(2) There was follow-up loss in this trial; eight participants in open surgery group and four participants in steroid injection group were follow-up loss and we assumed they had an adverse event.

(3) There was follow-up loss in this trial; eight participants in open surgery group and four participants in steroid injection group were follow-up loss and we assumed they had an adverse event.

(4) There was follow-up loss in this trial; eight participants in open surgery group and four participants in steroid injection group were follow-up loss and we assumed they had an adverse event.

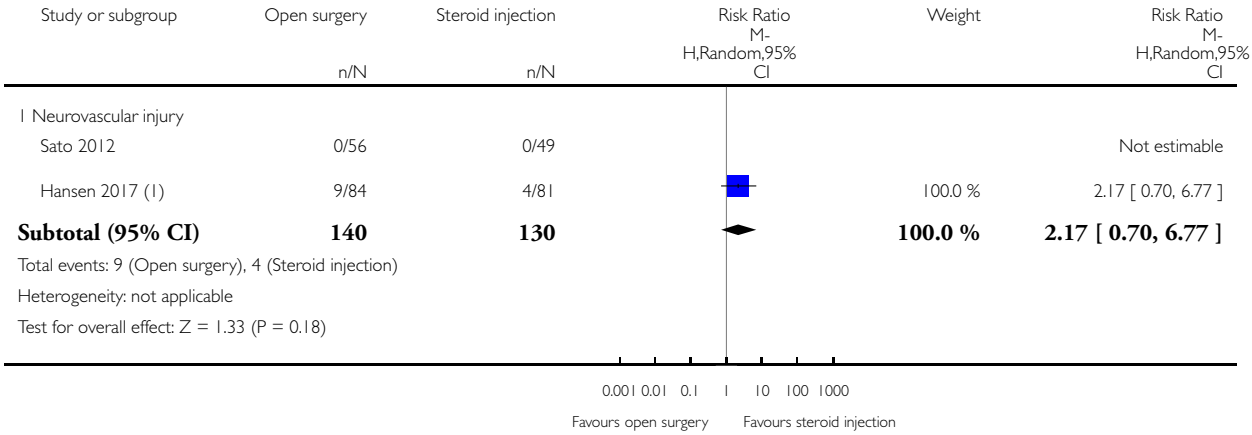
(5) There was follow-up loss in this trial; eight participants in open surgery group and four participants in steroid injection group were follow-up loss and we assumed they had an adverse event.

Analysis 1.6. Comparison 1 Open surgery versus steroid injection, Outcome 6 Neurovascular injury.

Review: Surgery for trigger finger

Comparison: 1 Open surgery versus steroid injection

Outcome: 6 Neurovascular injury



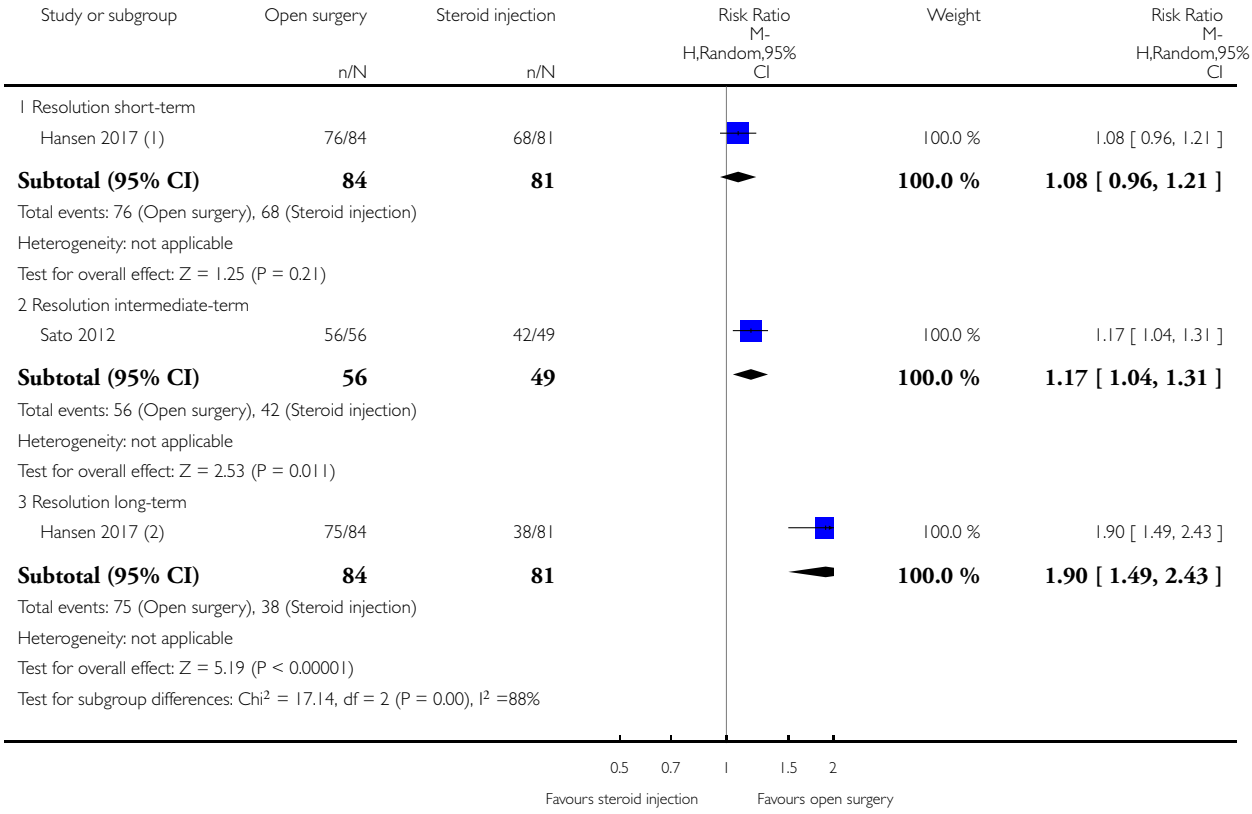
(1) There was follow-up loss in this trial; eight participants in open surgery group and four participants in steroid injection group were follow-up loss and we assumed they had an neurovascular injury.

Analysis 1.7. Comparison 1 Open surgery versus steroid injection, Outcome 7 Subgroup analyses for resolution.

Review: Surgery for trigger finger

Comparison: 1 Open surgery versus steroid injection

Outcome: 7 Subgroup analyses for resolution



(1) There was follow-up loss in this trial; eight participants in open surgery group and four participants in steroid injection group were follow-up loss and we assumed they did not have a positive outcome.

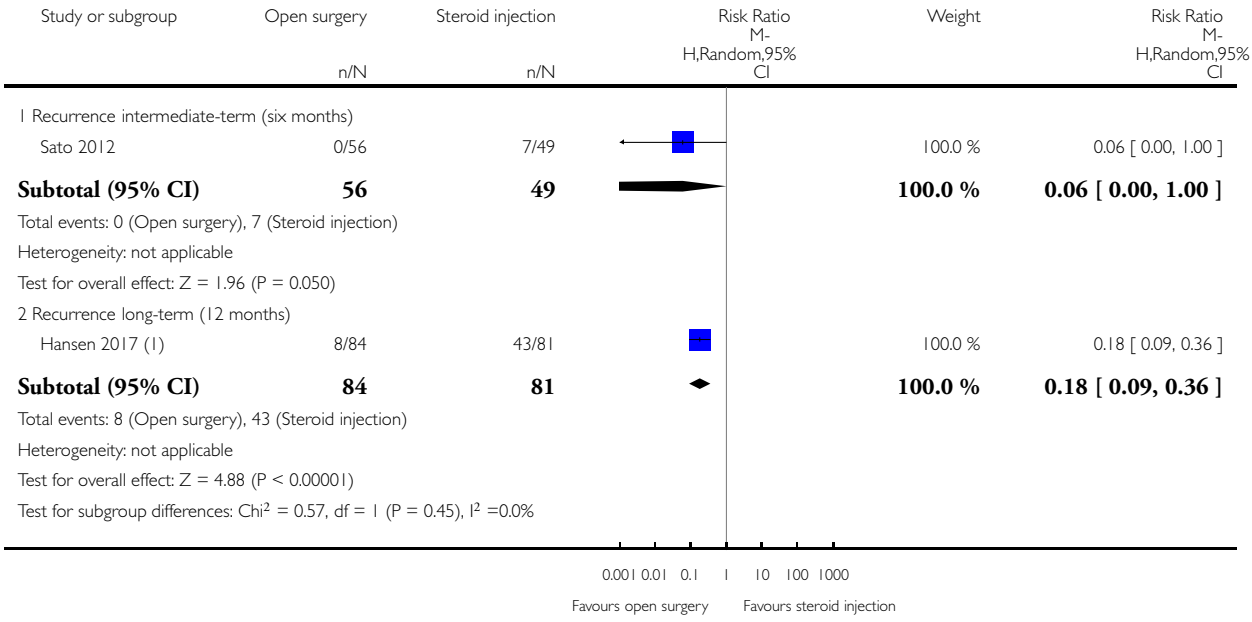
(2) There was follow-up loss in this trial; eight participants in open surgery group and four participants in steroid injection group were follow-up loss and we assumed they did not have a positive outcome.

Analysis 1.8. Comparison 1 Open surgery versus steroid injection, Outcome 8 Subgroup analyses for recurrence.

Review: Surgery for trigger finger

Comparison: 1 Open surgery versus steroid injection

Outcome: 8 Subgroup analyses for recurrence



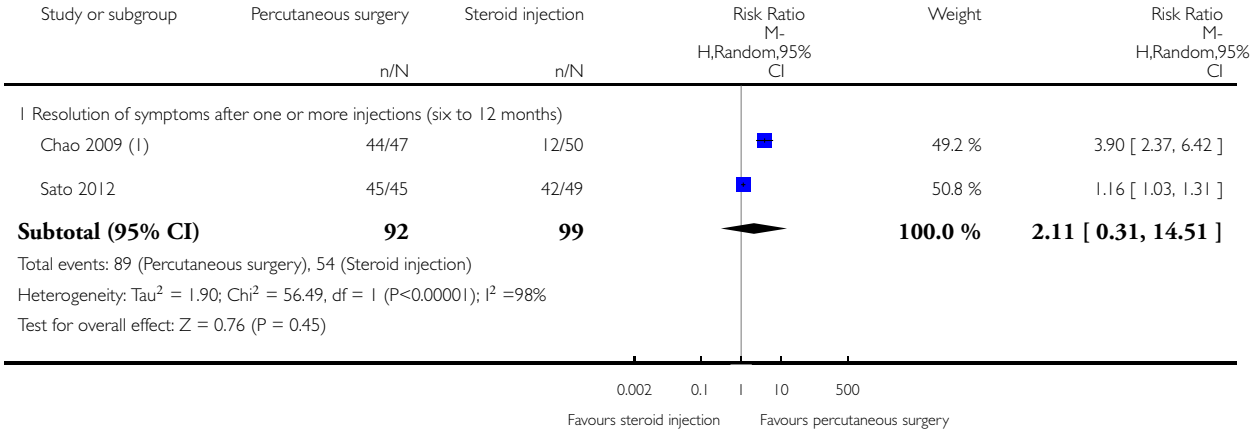
(1) There was follow-up loss in this trial; eight participants in open surgery group and four participants in steroid injection group were follow-up loss and we assumed they had recurrence.

Analysis 2.1. Comparison 2 Percutaneous surgery versus steroid injection, Outcome 1 Resolution of trigger finger.

Review: Surgery for trigger finger

Comparison: 2 Percutaneous surgery versus steroid injection

Outcome: 1 Resolution of trigger finger



(1) There was follow-up loss in this trial; one participant in percutaneous surgery group and three participants in steroid injection group were follow-up loss and we assumed they did not have a positive outcome.

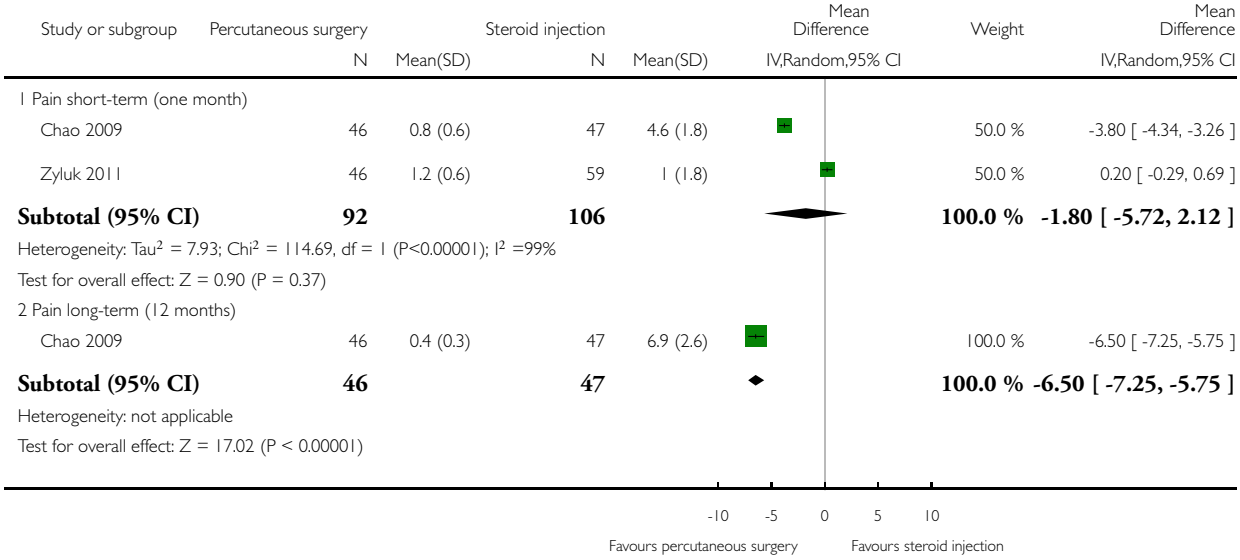
Analysis 2.2. Comparison 2 Percutaneous surgery versus steroid injection, Outcome 2 Pain (VAS: 0 to 10 scale).

Review: Surgery for trigger finger

Comparison: 2 Percutaneous surgery versus steroid injection

Outcome: 2 Pain (VAS: 0 to 10 scale)

Study or subgroup	Percutaneous surgery N	Mean(SD)	Steroid injection N	Mean(SD)	Mean Difference IV,Random,95% CI	Weight	Mean Difference IV,Random,95% CI
1 Pain short-term (one month)							
Chao 2009	46	0.8 (0.6)	47	4.6 (1.8)		50.0 %	-3.80 [-4.34, -3.26]
Zyluk 2011	46	1.2 (0.6)	59	1 (1.8)		50.0 %	0.20 [-0.29, 0.69]
Subtotal (95% CI)	**92**		**106**			**100.0 %**	**-1.80 [-5.72, 2.12]**
Heterogeneity: $Tau^2 = 7.93$; $Chi^2 = 114.69$, df = 1 (P<0.00001); I^2 =99%							
Test for overall effect: Z = 0.90 (P = 0.37)							
2 Pain long-term (12 months)							
Chao 2009	46	0.4 (0.3)	47	6.9 (2.6)		100.0 %	-6.50 [-7.25, -5.75]
Subtotal (95% CI)	**46**		**47**			**100.0 %**	**-6.50 [-7.25, -5.75]**
Heterogeneity: not applicable							
Test for overall effect: Z = 17.02 (P < 0.00001)							

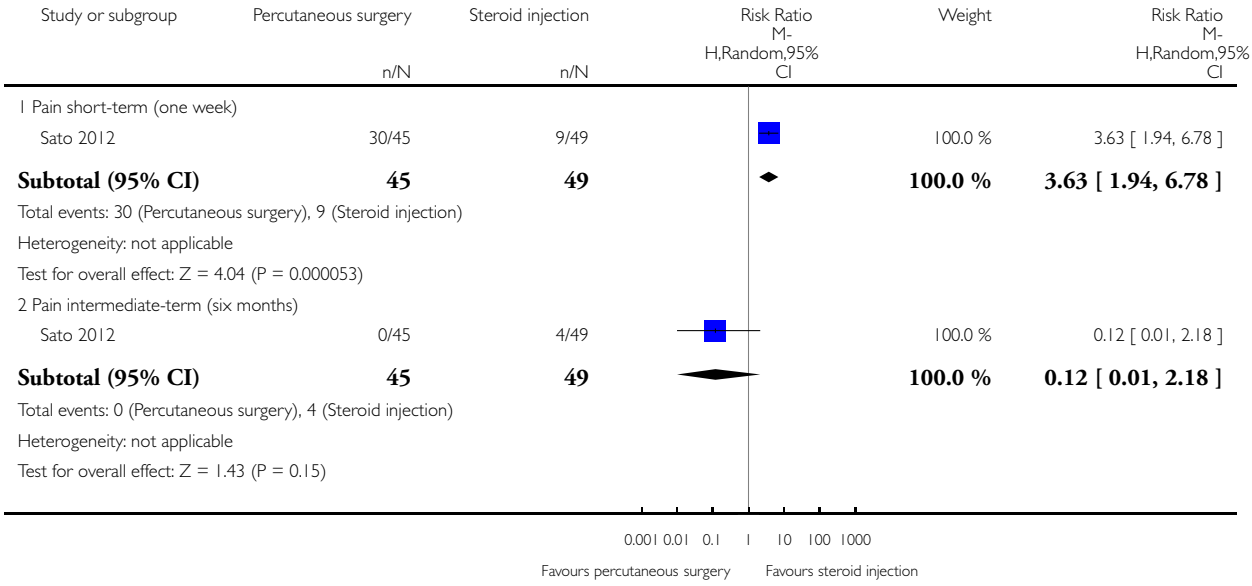


Analysis 2.3. Comparison 2 Percutaneous surgery versus steroid injection, Outcome 3 Pain on the palm of the hand.

Review: Surgery for trigger finger

Comparison: 2 Percutaneous surgery versus steroid injection

Outcome: 3 Pain on the palm of the hand

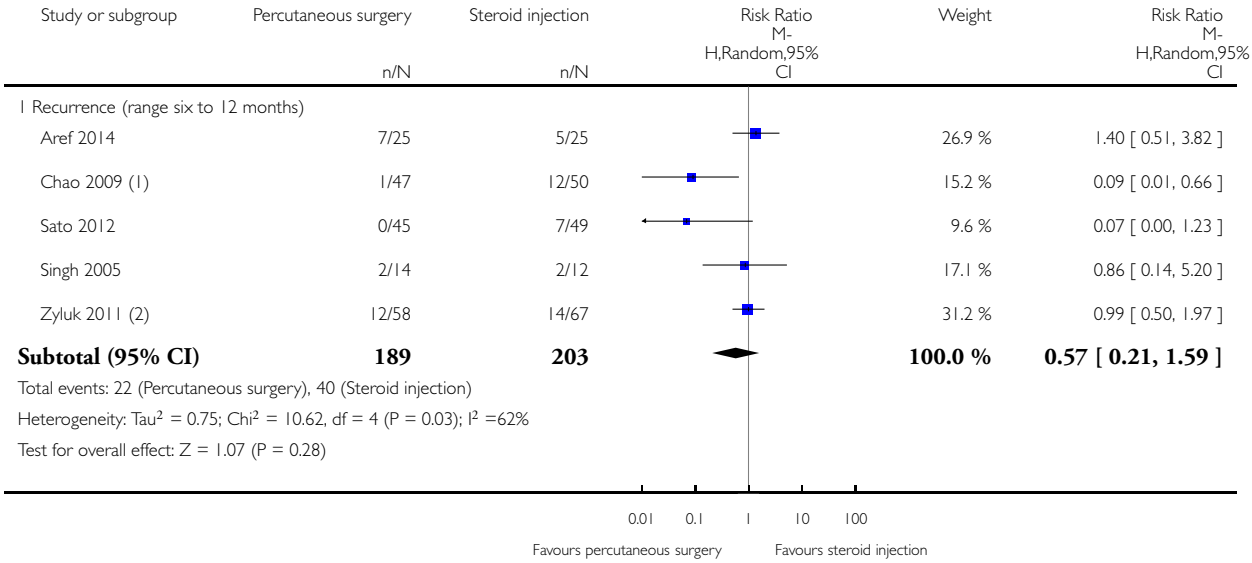


Analysis 2.4. Comparison 2 Percutaneous surgery versus steroid injection, Outcome 4 Frequency of recurrence.

Review: Surgery for trigger finger

Comparison: 2 Percutaneous surgery versus steroid injection

Outcome: 4 Frequency of recurrence



(1) There was follow-up loss in this trial; one participant in percutaneous surgery group and three participants in steroid injection group were follow-up loss and we assumed they had recurrence.

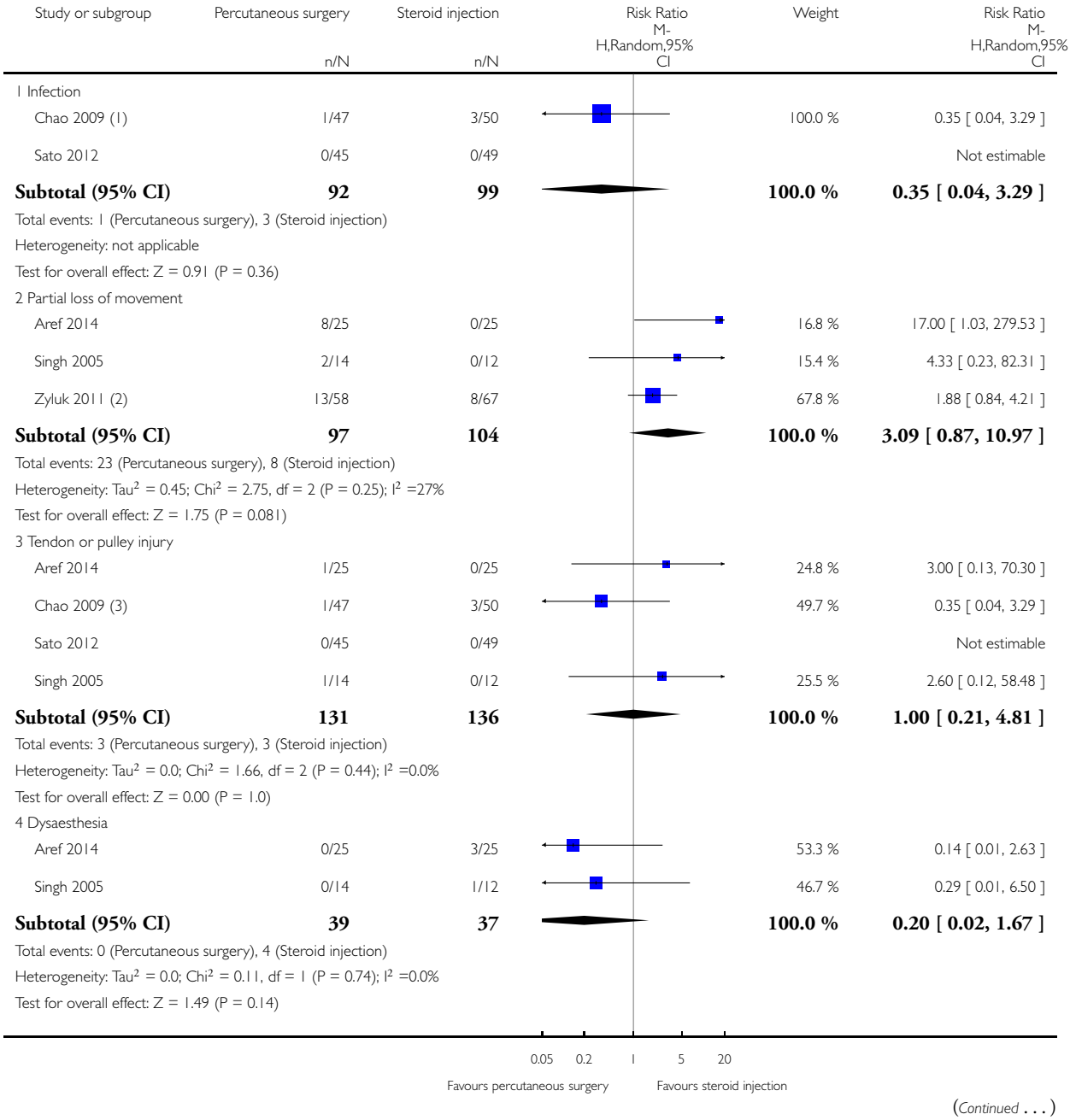
(2) There was follow-up loss in this trial; twelve participant in percutaneous surgery group and eight participants in steroid injection group were follow-up loss and we assumed they had recurrence.

Analysis 2.5. Comparison 2 Percutaneous surgery versus steroid injection, Outcome 5 Adverse events.

Review: Surgery for trigger finger

Comparison: 2 Percutaneous surgery versus steroid injection

Outcome: 5 Adverse events



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Study or subgroup	Percutaneous surgery n/N	Steroid injection n/N	Risk Ratio M-H,Random,95% CI	Weight	Risk Ratio M-H,Random,95% CI
5 Skin atrophy or hypopigmentation					
Aref 2014	0/25	3/25		100.0 %	0.14 [0.01, 2.63]
Subtotal (95% CI)	**25**	**25**		**100.0 %**	**0.14 [0.01, 2.63]**
Total events: 0 (Percutaneous surgery), 3 (Steroid injection)					
Heterogeneity: not applicable					
Test for overall effect: Z = 1.31 (P = 0.19)					
6 Total adverse events					
Aref 2014	9/25	6/25		40.2 %	1.50 [0.63, 3.59]
Chao 2009 (4)	1/47	3/50		6.2 %	0.35 [0.04, 3.29]
Sato 2012	0/45	0/49			Not estimable
Singh 2005	3/14	1/12		6.8 %	2.57 [0.31, 21.59]
Zyluk 2011 (5)	13/58	8/67		46.9 %	1.88 [0.84, 4.21]
Subtotal (95% CI)	**189**	**203**		**100.0 %**	**1.58 [0.91, 2.75]**
Total events: 26 (Percutaneous surgery), 18 (Steroid injection)					
Heterogeneity: Tau^2 = 0.0; Chi^2 = 2.13, df = 3 (P = 0.55); I^2 =0.0%					
Test for overall effect: Z = 1.62 (P = 0.10)					
Test for subgroup differences: Chi^2 = 8.89, df = 5 (P = 0.11), I^2 =44%					

(1) There was follow-up loss in this trial; one participant in percutaneous surgery group and three participants in steroid injection group were follow-up loss and we assumed they had an adverse event.

(2) There was follow-up loss in this trial; twelve participant in percutaneous surgery group and eight participants in steroid injection group were follow-up loss and we assumed they had an adverse event.

(3) There was follow-up loss in this trial; one participant in percutaneous surgery group and three participants in steroid injection group were follow-up loss and we assumed they had an adverse event.

(4) There was follow-up loss in this trial; one participant in percutaneous surgery group and three participants in steroid injection group were follow-up loss and we assumed they had an adverse event.

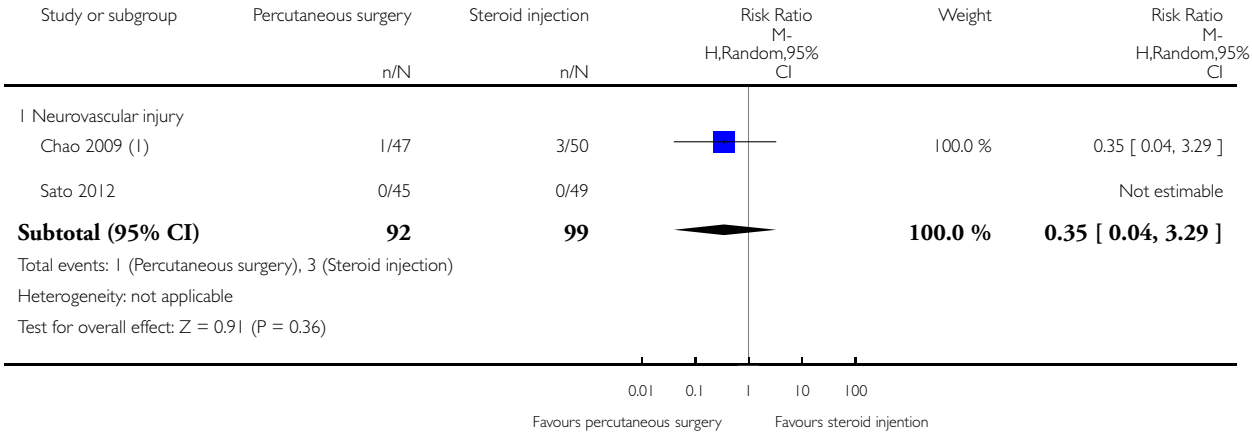
(5) There was follow-up loss in this trial; twelve participant in percutaneous surgery group and eight participants in steroid injection group were follow-up loss and we assumed they had an adverse event.

Analysis 2.6. Comparison 2 Percutaneous surgery versus steroid injection, Outcome 6 Neurovascular injury.

Review: Surgery for trigger finger

Comparison: 2 Percutaneous surgery versus steroid injection

Outcome: 6 Neurovascular injury



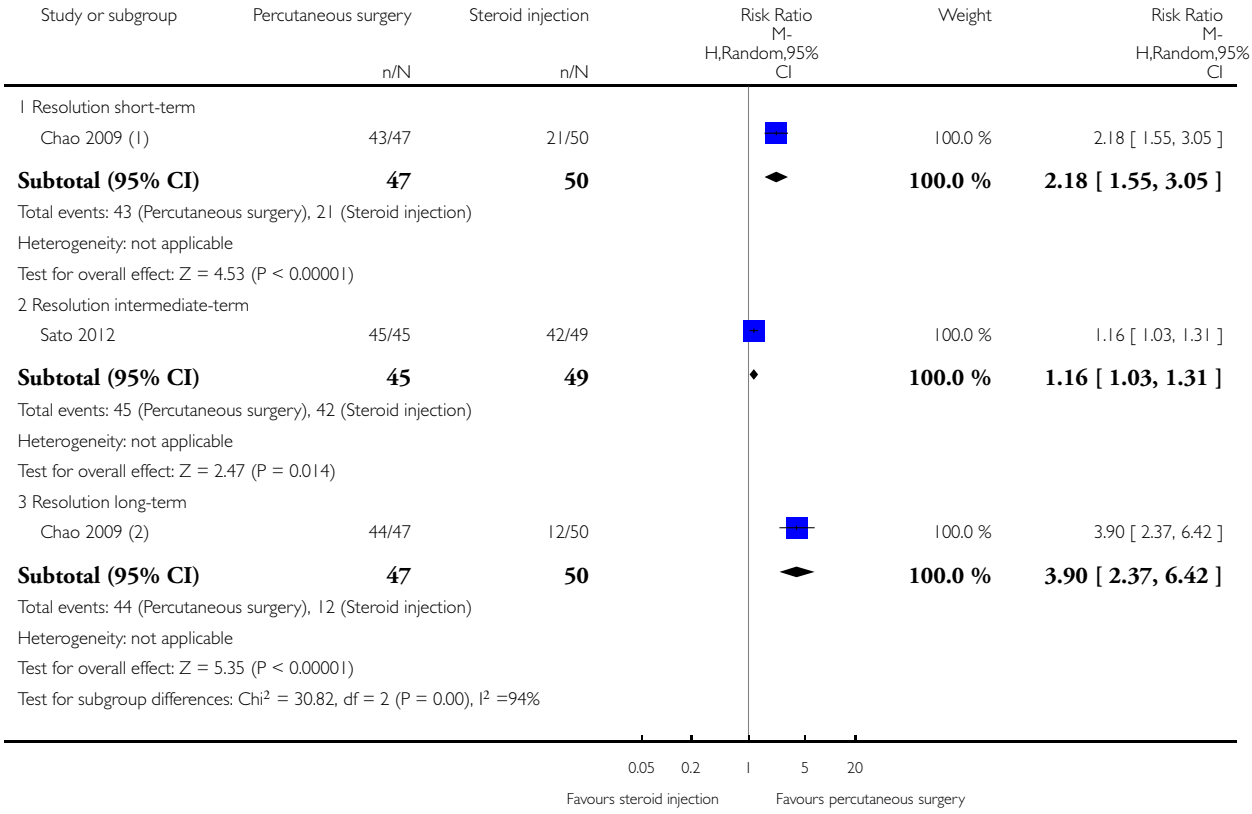
(1) There was follow-up loss in this trial; one participant in percutaneous surgery group and three participants in steroid injection group were follow-up loss and we assumed they had neurovascular injury.

Analysis 2.7. Comparison 2 Percutaneous surgery versus steroid injection, Outcome 7 Subgroup analyses for resolution.

Review: Surgery for trigger finger

Comparison: 2 Percutaneous surgery versus steroid injection

Outcome: 7 Subgroup analyses for resolution



(1) There was follow-up loss in this trial; one participant in percutaneous surgery group and three participants in steroid injection group were follow-up loss and we assumed they did not have a positive outcome.

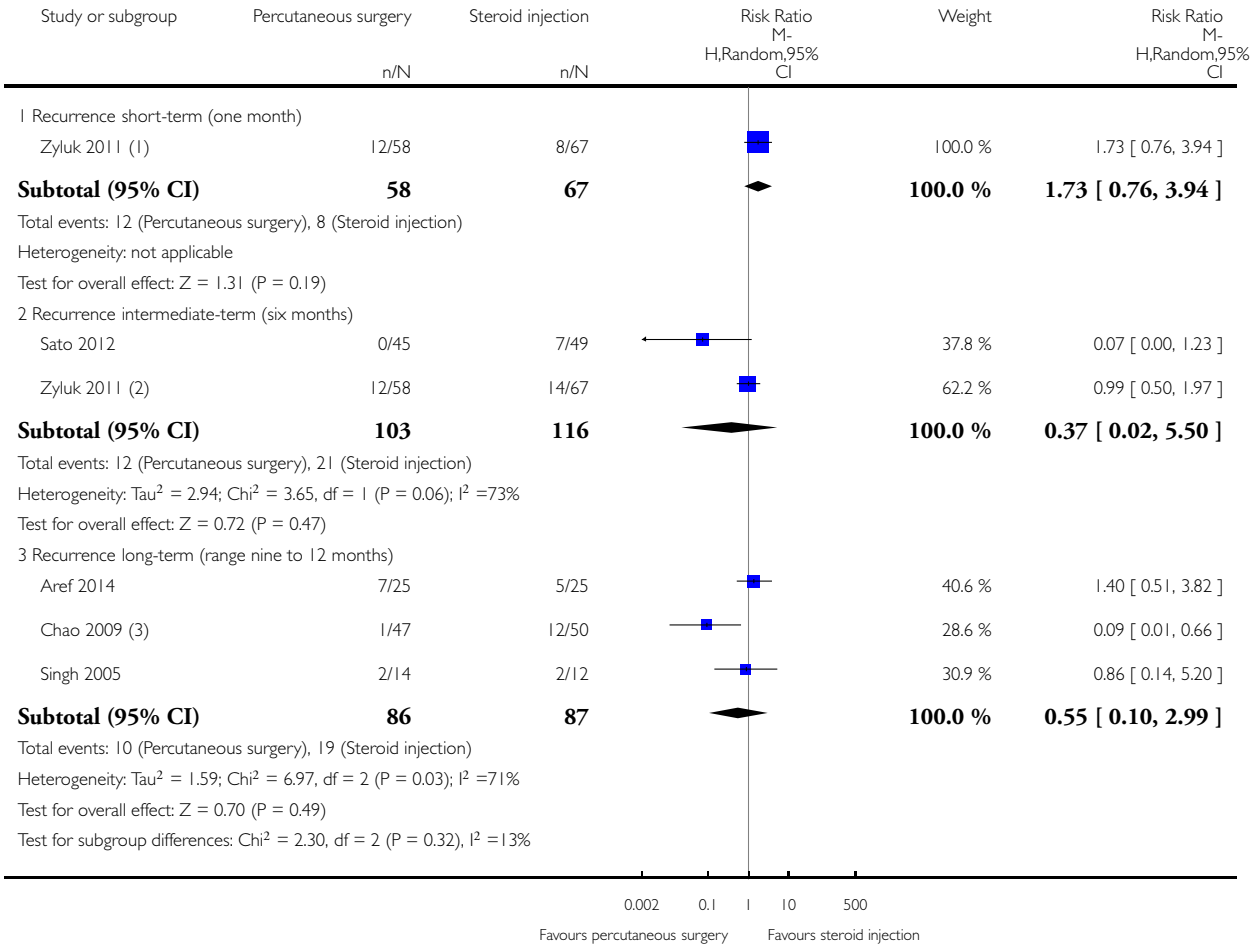
(2) There was follow-up loss in this trial; one participant in percutaneous surgery group and three participants in steroid injection group were follow-up loss and we assumed they did not have a positive outcome.

Analysis 2.8. Comparison 2 Percutaneous surgery versus steroid injection, Outcome 8 Subgroup analyses for recurrence.

Review: Surgery for trigger finger

Comparison: 2 Percutaneous surgery versus steroid injection

Outcome: 8 Subgroup analyses for recurrence



(1) There was follow-up loss in this trial; twelve participant in percutaneous surgery group and eight participants in steroid injection group were follow-up loss and we assumed they had recurrence.

(2) There was follow-up loss in this trial; twelve participant in percutaneous surgery group and eight participants in steroid injection group were follow-up loss and we assumed they had recurrence.

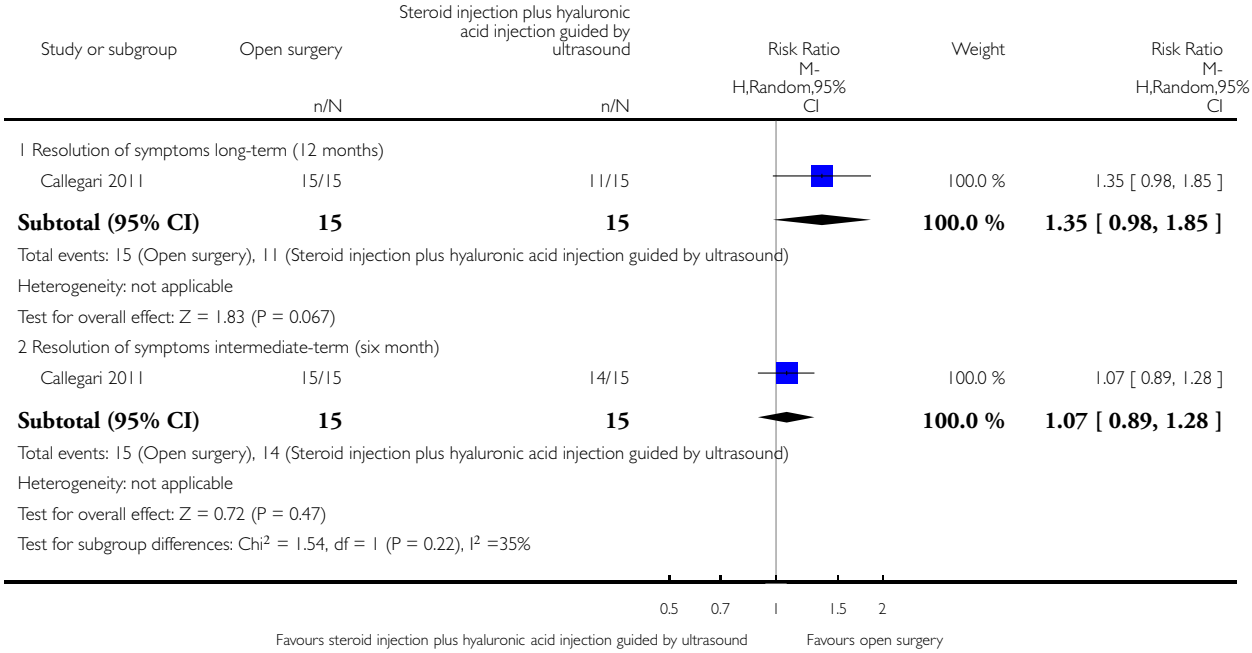
(3) There was follow-up loss in this trial; one participant in percutaneous surgery group and three participants in steroid injection group were follow-up loss and we assumed they had recurrence.

Analysis 3.1. Comparison 3 Open surgery versus steroid injection plus hyaluronic acid injection guided by ultrasound, Outcome 1 Resolution of trigger finger.

Review: Surgery for trigger finger

Comparison: 3 Open surgery versus steroid injection plus hyaluronic acid injection guided by ultrasound

Outcome: 1 Resolution of trigger finger

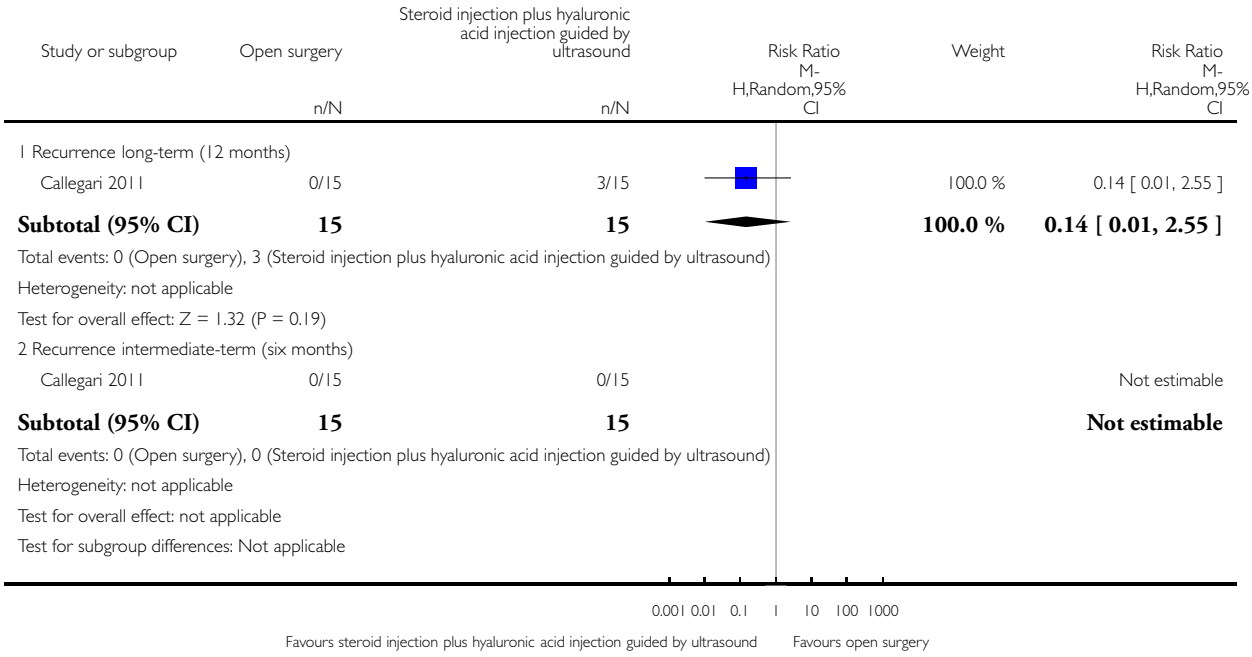


Analysis 3.2. Comparison 3 Open surgery versus steroid injection plus hyaluronic acid injection guided by ultrasound, Outcome 2 Frequency of recurrence.

Review: Surgery for trigger finger

Comparison: 3 Open surgery versus steroid injection plus hyaluronic acid injection guided by ultrasound

Outcome: 2 Frequency of recurrence

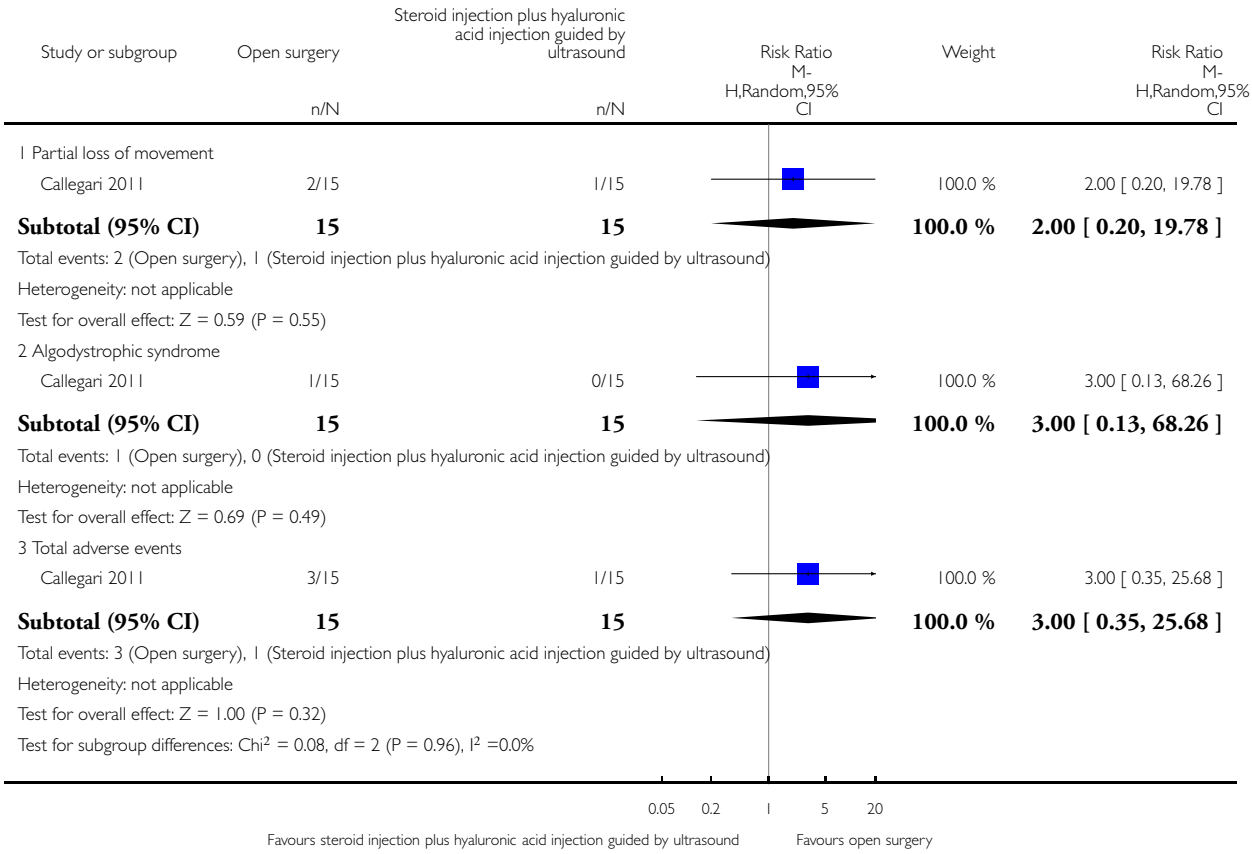


Analysis 3.3. Comparison 3 Open surgery versus steroid injection plus hyaluronic acid injection guided by ultrasound, Outcome 3 Adverse events.

Review: Surgery for trigger finger

Comparison: 3 Open surgery versus steroid injection plus hyaluronic acid injection guided by ultrasound

Outcome: 3 Adverse events

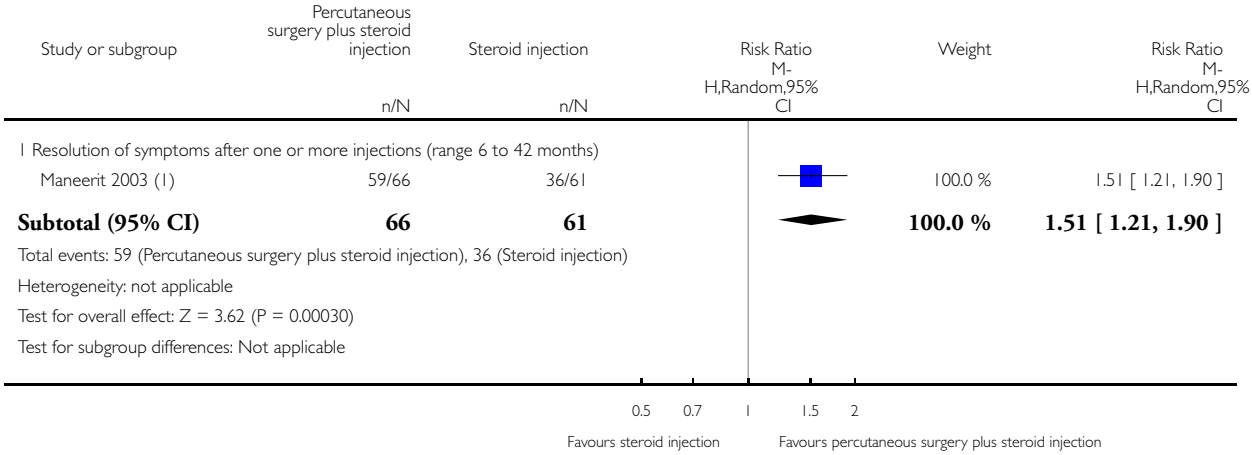


Analysis 4.1. Comparison 4 Percutaneous surgery plus steroid injection versus steroid injection, Outcome 1 Resolution of trigger finger.

Review: Surgery for trigger finger

Comparison: 4 Percutaneous surgery plus steroid injection versus steroid injection

Outcome: 1 Resolution of trigger finger



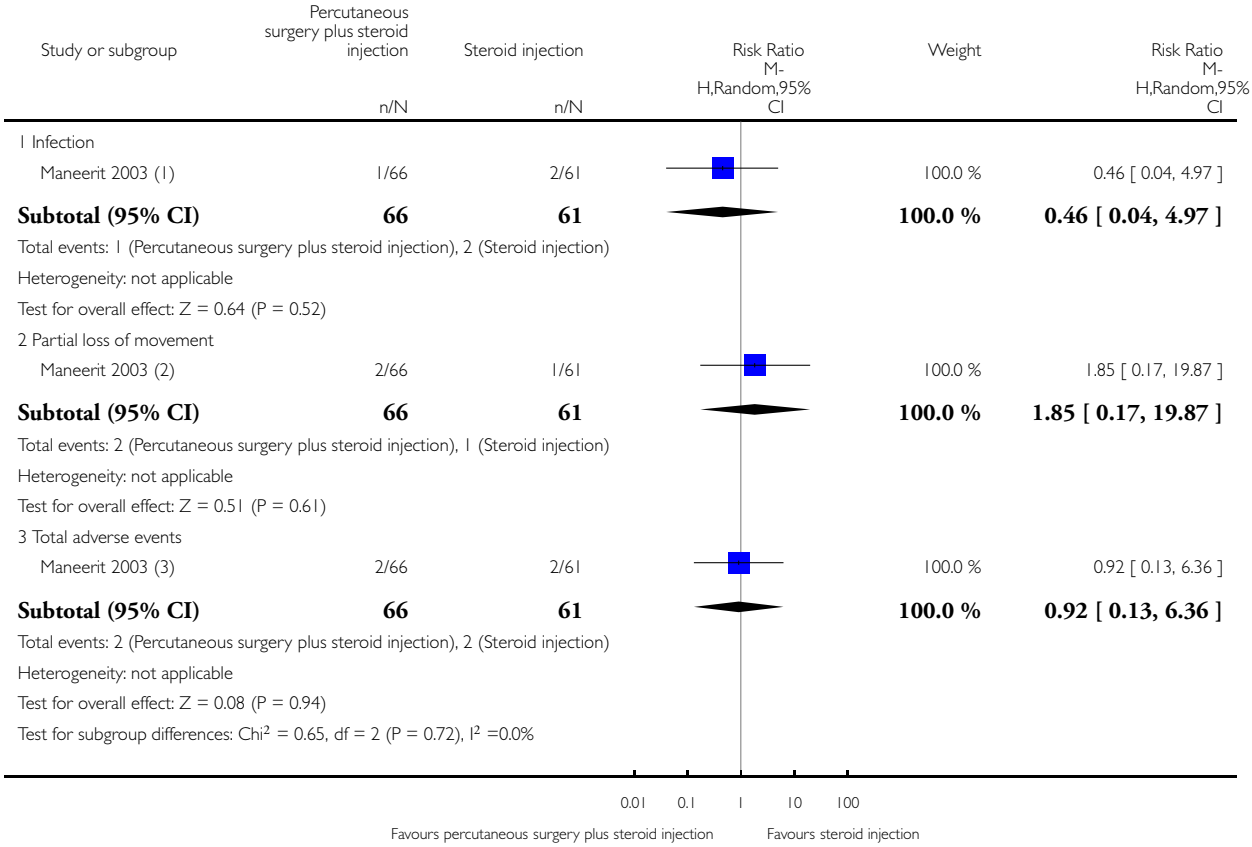
(1) There was follow-up loss in this trial; one participant in percutaneous surgery plus steroid injection group and one participant in steroid injection group were follow-up loss and we assumed they did not have a positive outcome.

Analysis 4.2. Comparison 4 Percutaneous surgery plus steroid injection versus steroid injection, Outcome 2 Adverse events.

Review: Surgery for trigger finger

Comparison: 4 Percutaneous surgery plus steroid injection versus steroid injection

Outcome: 2 Adverse events



(1) There was follow-up loss in this trial; one participant in percutaneous surgery plus steroid injection group and one participant in steroid injection group were follow-up loss and we assumed they had an adverse event.

(2) There was follow-up loss in this trial; one participant in percutaneous surgery plus steroid injection group and one participant in steroid injection group were follow-up loss and we assumed they had an adverse event.

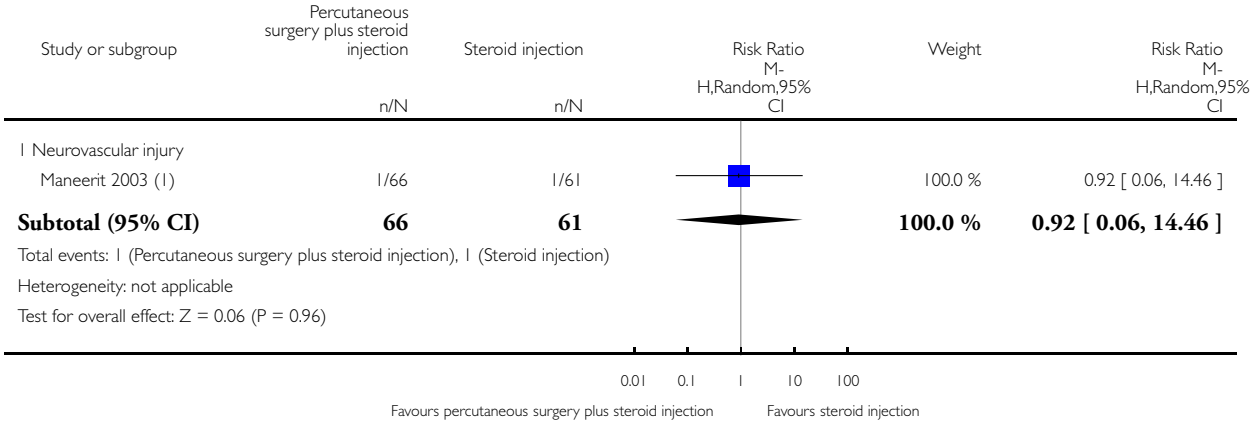
(3) There was follow-up loss in this trial; one participant in percutaneous surgery plus steroid injection group and one participant in steroid injection group were follow-up loss and we assumed they had an adverse event.

Analysis 4.3. Comparison 4 Percutaneous surgery plus steroid injection versus steroid injection, Outcome 3 Neurovascular injury.

Review: Surgery for trigger finger

Comparison: 4 Percutaneous surgery plus steroid injection versus steroid injection

Outcome: 3 Neurovascular injury



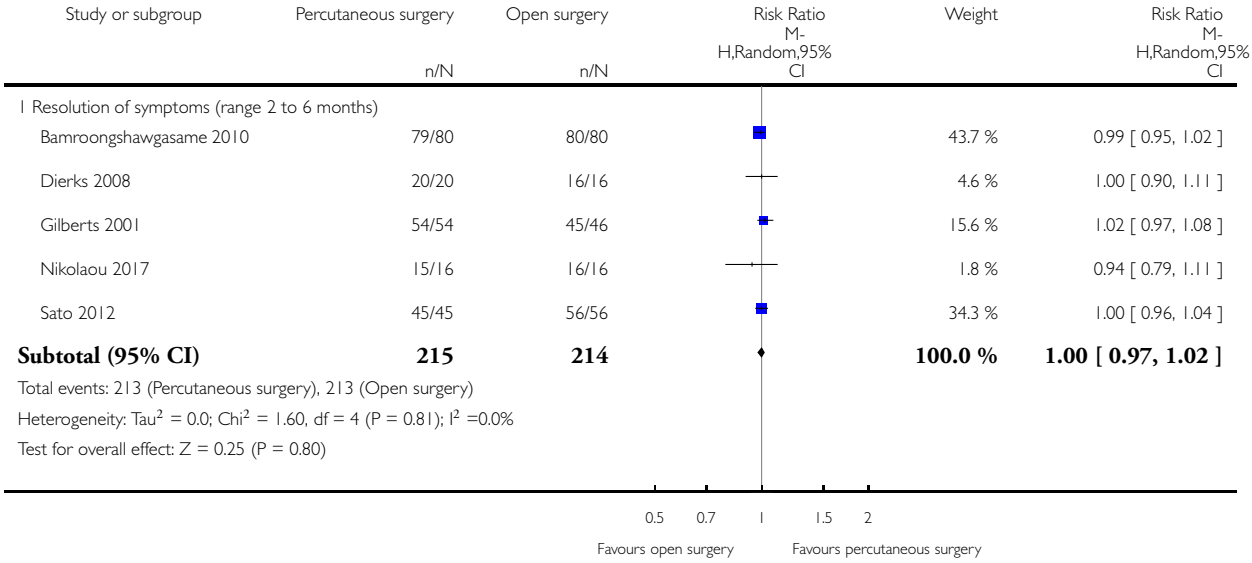
(1) There was follow-up loss in this trial; one participant in percutaneous surgery plus steroid injection group and one participant in steroid injection group were follow-up loss and we assumed they had neurovascular injury.

Analysis 5.1. Comparison 5 Percutaneous surgery versus open surgery, Outcome 1 Resolution of trigger finger.

Review: Surgery for trigger finger

Comparison: 5 Percutaneous surgery versus open surgery

Outcome: 1 Resolution of trigger finger

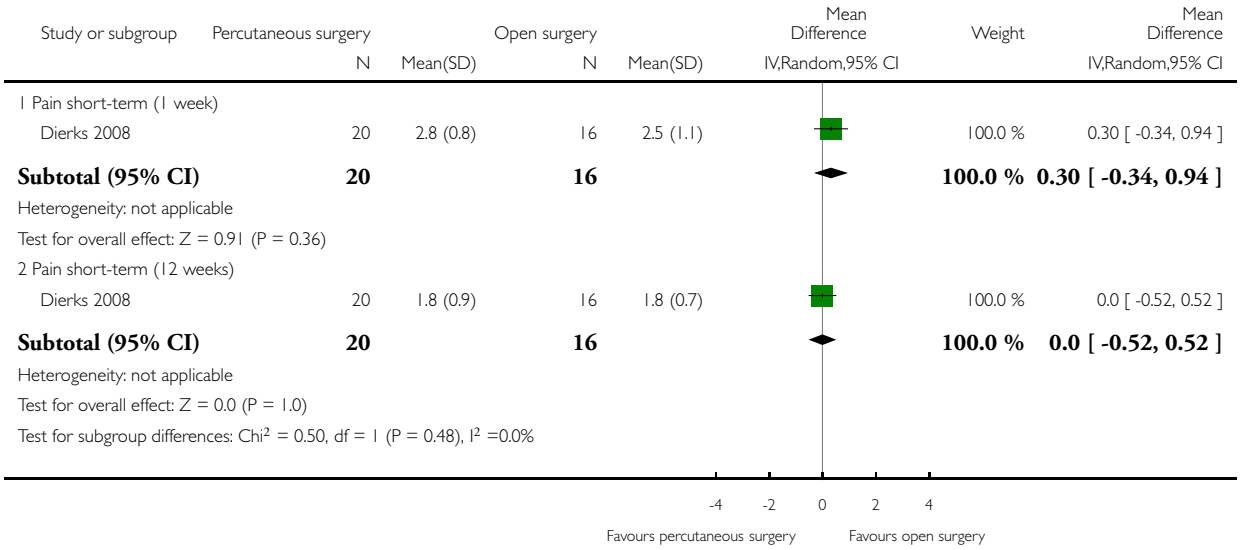


Analysis 5.2. Comparison 5 Percutaneous surgery versus open surgery, Outcome 2 Pain (1 to 6 scale).

Review: Surgery for trigger finger

Comparison: 5 Percutaneous surgery versus open surgery

Outcome: 2 Pain (1 to 6 scale)

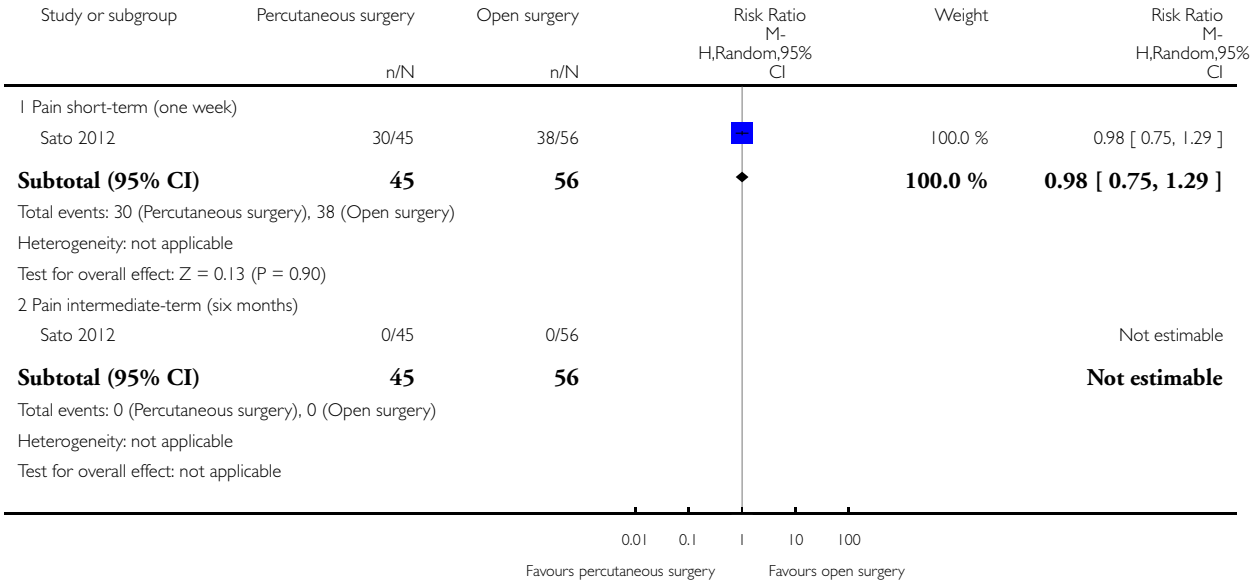


Analysis 5.3. Comparison 5 Percutaneous surgery versus open surgery, Outcome 3 Pain on the palm of the hand.

Review: Surgery for trigger finger

Comparison: 5 Percutaneous surgery versus open surgery

Outcome: 3 Pain on the palm of the hand



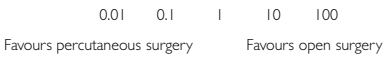
Analysis 5.4. Comparison 5 Percutaneous surgery versus open surgery, Outcome 4 Frequency of recurrence.

Review: Surgery for trigger finger

Comparison: 5 Percutaneous surgery versus open surgery

Outcome: 4 Frequency of recurrence

Study or subgroup	Percutaneous surgery n/N	Open surgery n/N	Risk Ratio M-H,Random,95% CI	Weight	Risk Ratio M-H,Random,95% CI
1 Recurrence (range 2 to 6 months)					
Bamroongshawgasame 2010	0/80	0/80			Not estimable
Dierks 2008	0/20	0/16			Not estimable
Gilberts 2001	0/54	1/46		100.0 %	0.28 [0.01, 6.83]
Sato 2012	0/45	0/56			Not estimable
Subtotal (95% CI)	**199**	**198**		**100.0 %**	**0.28 [0.01, 6.83]**
Total events: 0 (Percutaneous surgery), 1 (Open surgery)					
Heterogeneity: not applicable					
Test for overall effect: Z = 0.77 (P = 0.44)					



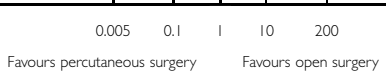
Analysis 5.5. Comparison 5 Percutaneous surgery versus open surgery, Outcome 5 Adverse events.

Review: Surgery for trigger finger

Comparison: 5 Percutaneous surgery versus open surgery

Outcome: 5 Adverse events

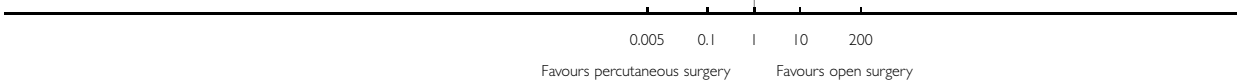
Study or subgroup	Percutaneous surgery n/N	Open surgery n/N	Risk Ratio M-H,Random,95% CI	Weight	Risk Ratio M-H,Random,95% CI
1 Infection					
Nikolaou 2017	0/16	0/16			Not estimable
Sato 2012	0/45	0/56			Not estimable
Subtotal (95% CI)	**61**	**72**			**Not estimable**
Total events: 0 (Percutaneous surgery), 0 (Open surgery)					
Heterogeneity: not applicable					
Test for overall effect: not applicable					
2 Partial loss of movement					
Nikolaou 2017	0/16	0/16			Not estimable
Subtotal (95% CI)	**16**	**16**			**Not estimable**
Total events: 0 (Percutaneous surgery), 0 (Open surgery)					
Heterogeneity: not applicable					
Test for overall effect: not applicable					
3 Tendon or pulley injury					
Sato 2012	0/45	0/56			Not estimable
Bamroongshawgasame 2010	0/80	0/80			Not estimable
Subtotal (95% CI)	**125**	**136**			**Not estimable**
Total events: 0 (Percutaneous surgery), 0 (Open surgery)					
Heterogeneity: not applicable					
Test for overall effect: not applicable					
4 Edema or inflammation or hematoma					
Gilberts 2001	1/54	2/46		63.7 %	0.43 [0.04, 4.55]
Dierks 2008	1/20	0/16		36.3 %	2.43 [0.11, 55.89]
Subtotal (95% CI)	**74**	**62**		**100.0 %**	**0.80 [0.12, 5.30]**
Total events: 2 (Percutaneous surgery), 2 (Open surgery)					
Heterogeneity: $Tau^2 = 0.0$; $Chi^2 = 0.76$, df = 1 (P = 0.38); $I^2 = 0.0\%$					
Test for overall effect: Z = 0.23 (P = 0.82)					
5 Adherence					
Gilberts 2001	0/54	1/46		100.0 %	0.28 [0.01, 6.83]
Subtotal (95% CI)	**54**	**46**		**100.0 %**	**0.28 [0.01, 6.83]**
Total events: 0 (Percutaneous surgery), 1 (Open surgery)					
Heterogeneity: not applicable					



(*Continued* . . .)

(. . . *Continued*)

Study or subgroup	Percutaneous surgery n/N	Open surgery n/N	Risk Ratio M-H,Random,95% CI	Weight	Risk Ratio M-H,Random,95% CI
Test for overall effect: Z = 0.77 (P = 0.44)					
6 Others (it did not specified)					
Gilberts 2001	1/54	0/46		100.0 %	2.56 [0.11, 61.45]
Subtotal (95% CI)	**54**	**46**		**100.0 %**	**2.56 [0.11, 61.45]**
Total events: 1 (Percutaneous surgery), 0 (Open surgery)					
Heterogeneity: not applicable					
Test for overall effect: Z = 0.58 (P = 0.56)					
7 Total adverse events					
Bamroongshawgasame 2010	0/80	0/80			Not estimable
Nikolaou 2017	0/16	0/16			Not estimable
Sato 2012	0/45	0/56			Not estimable
Gilberts 2001	2/54	3/46		76.3 %	0.57 [0.10, 3.25]
Dierks 2008	1/20	0/16		23.7 %	2.43 [0.11, 55.89]
Subtotal (95% CI)	**215**	**214**		**100.0 %**	**0.80 [0.17, 3.68]**
Total events: 3 (Percutaneous surgery), 3 (Open surgery)					
Heterogeneity: Tau^2 = 0.0; Chi^2 = 0.63, df = 1 (P = 0.43); I^2 =0.0%					
Test for overall effect: Z = 0.29 (P = 0.78)					
Test for subgroup differences: Chi^2 = 0.92, df = 3 (P = 0.82), I^2 =0.0%					

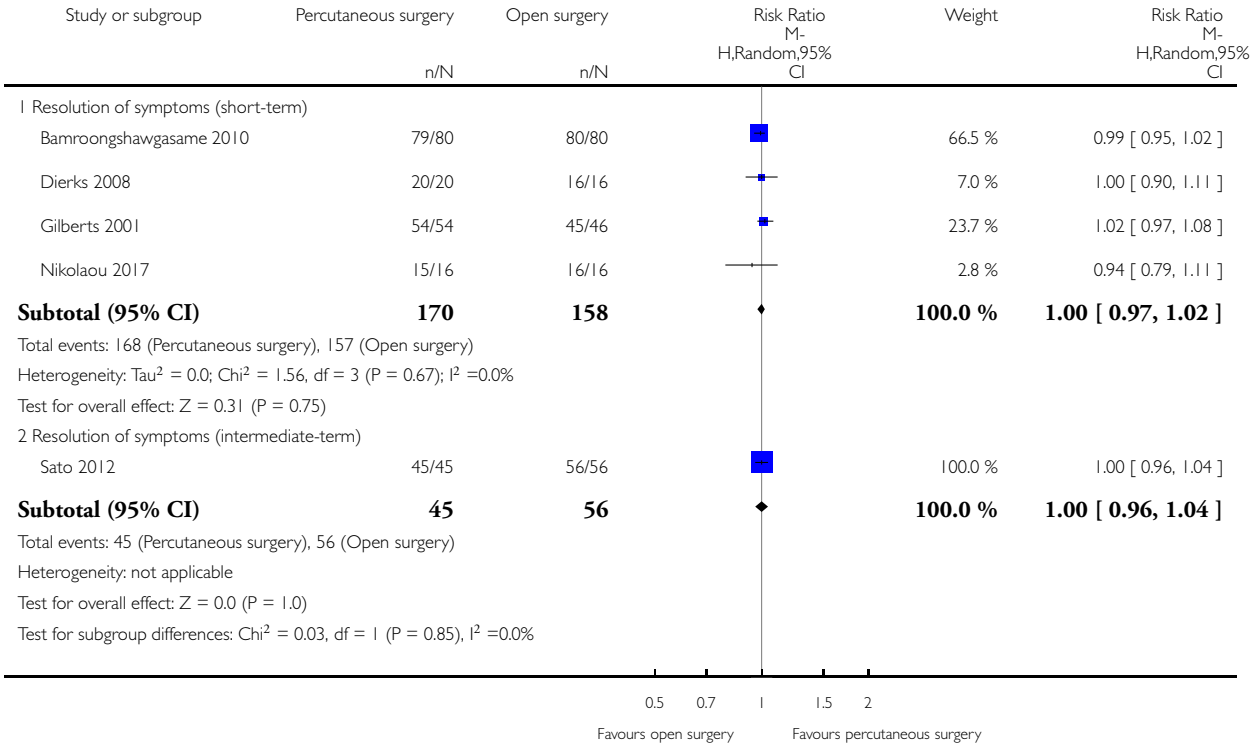


Analysis 5.6. Comparison 5 Percutaneous surgery versus open surgery, Outcome 6 Subgroup analyses for resolution.

Review: Surgery for trigger finger

Comparison: 5 Percutaneous surgery versus open surgery

Outcome: 6 Subgroup analyses for resolution

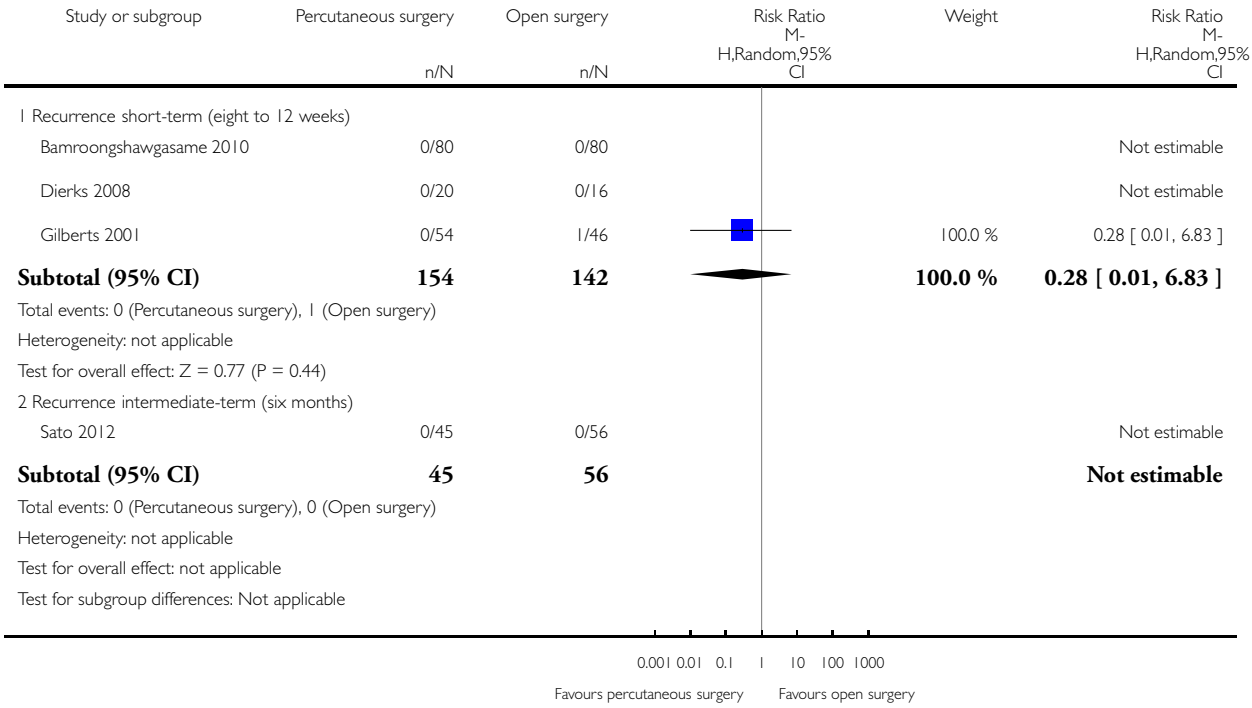


Analysis 5.7. Comparison 5 Percutaneous surgery versus open surgery, Outcome 7 Subgroup analyses for recurrence.

Review: Surgery for trigger finger

Comparison: 5 Percutaneous surgery versus open surgery

Outcome: 7 Subgroup analyses for recurrence

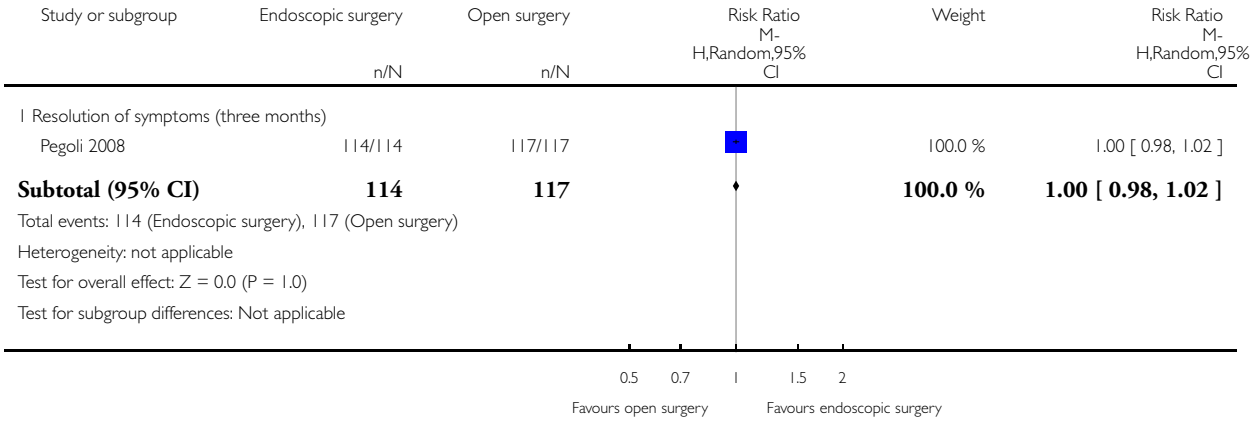


Analysis 6.1. Comparison 6 Endoscopic surgery versus open surgery, Outcome 1 Resolution of trigger finger.

Review: Surgery for trigger finger

Comparison: 6 Endoscopic surgery versus open surgery

Outcome: 1 Resolution of trigger finger

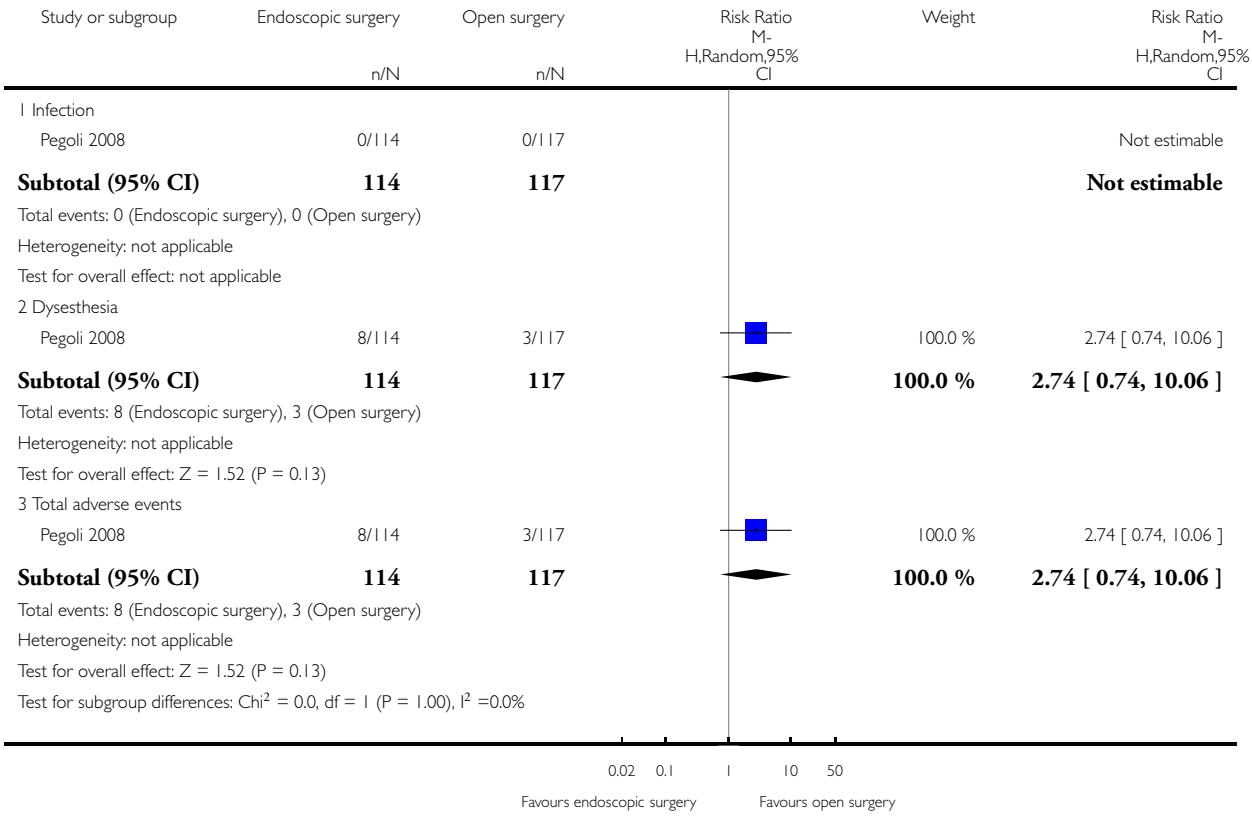


Analysis 6.2. Comparison 6 Endoscopic surgery versus open surgery, Outcome 2 Adverse events.

Review: Surgery for trigger finger

Comparison: 6 Endoscopic surgery versus open surgery

Outcome: 2 Adverse events

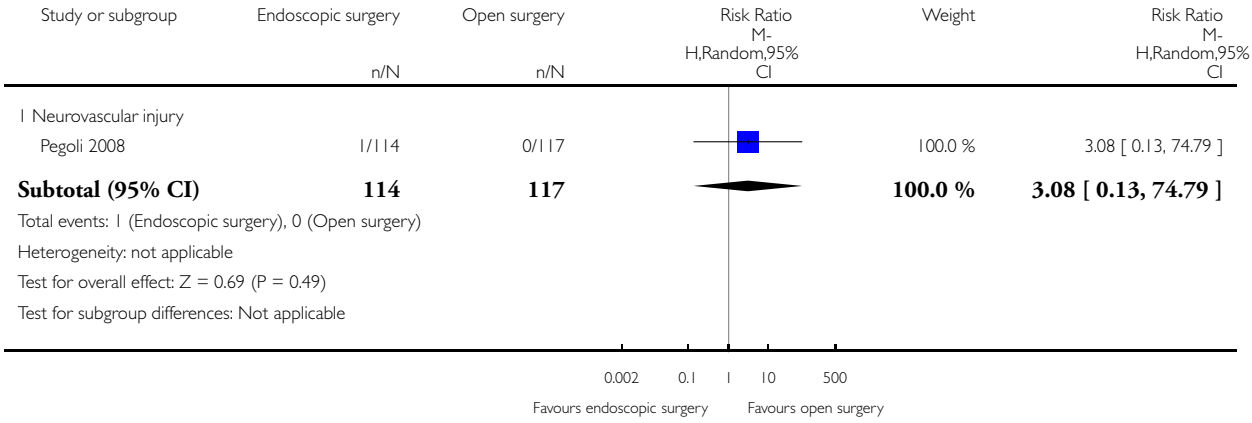


Analysis 6.3. Comparison 6 Endoscopic surgery versus open surgery, Outcome 3 Neurovascular injury.

Review: Surgery for trigger finger

Comparison: 6 Endoscopic surgery versus open surgery

Outcome: 3 Neurovascular injury

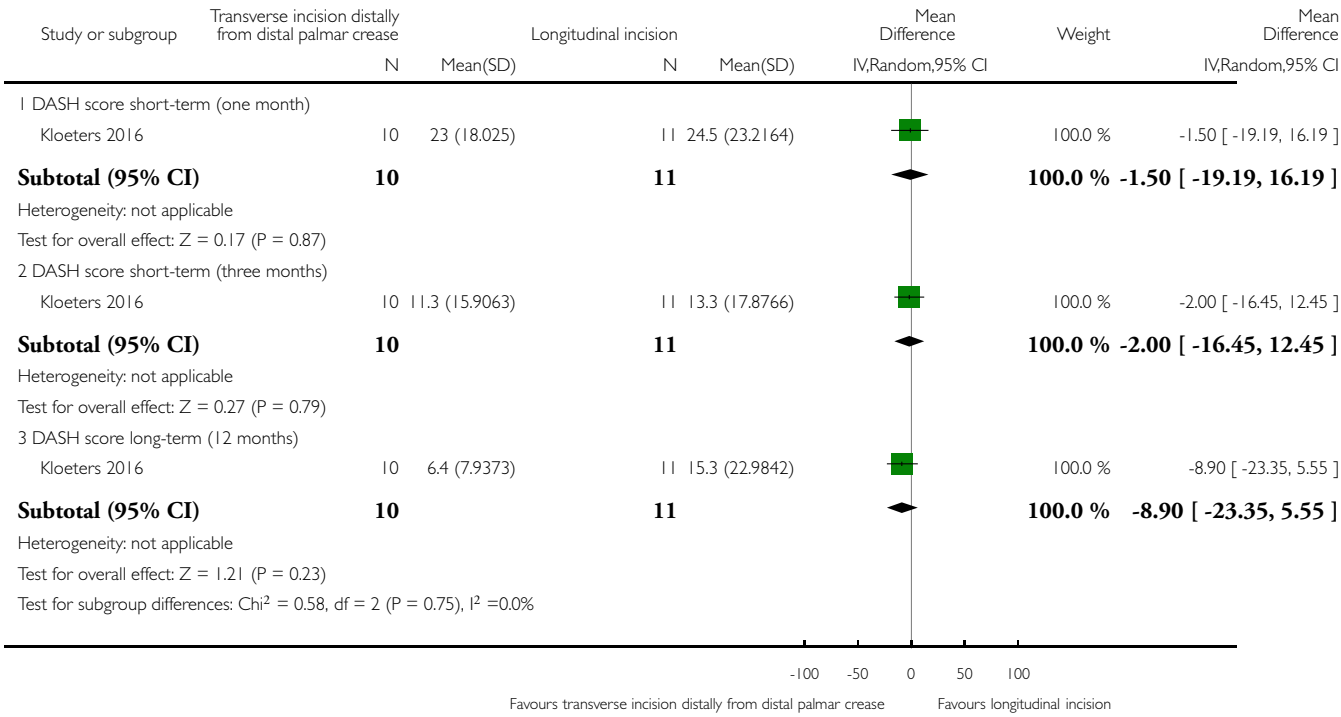


Analysis 7.1. Comparison 7 Open surgery by transverse incision of the skin about 2-3 mm distally from distal palmar crease versus open surgery by longitudinal incision of the skin, Outcome 1 DASH score.

Review: Surgery for trigger finger

Comparison: 7 Open surgery by transverse incision of the skin about 2– 3 mm distally from distal palmar crease versus open surgery by longitudinal incision of the skin

Outcome: 1 DASH score

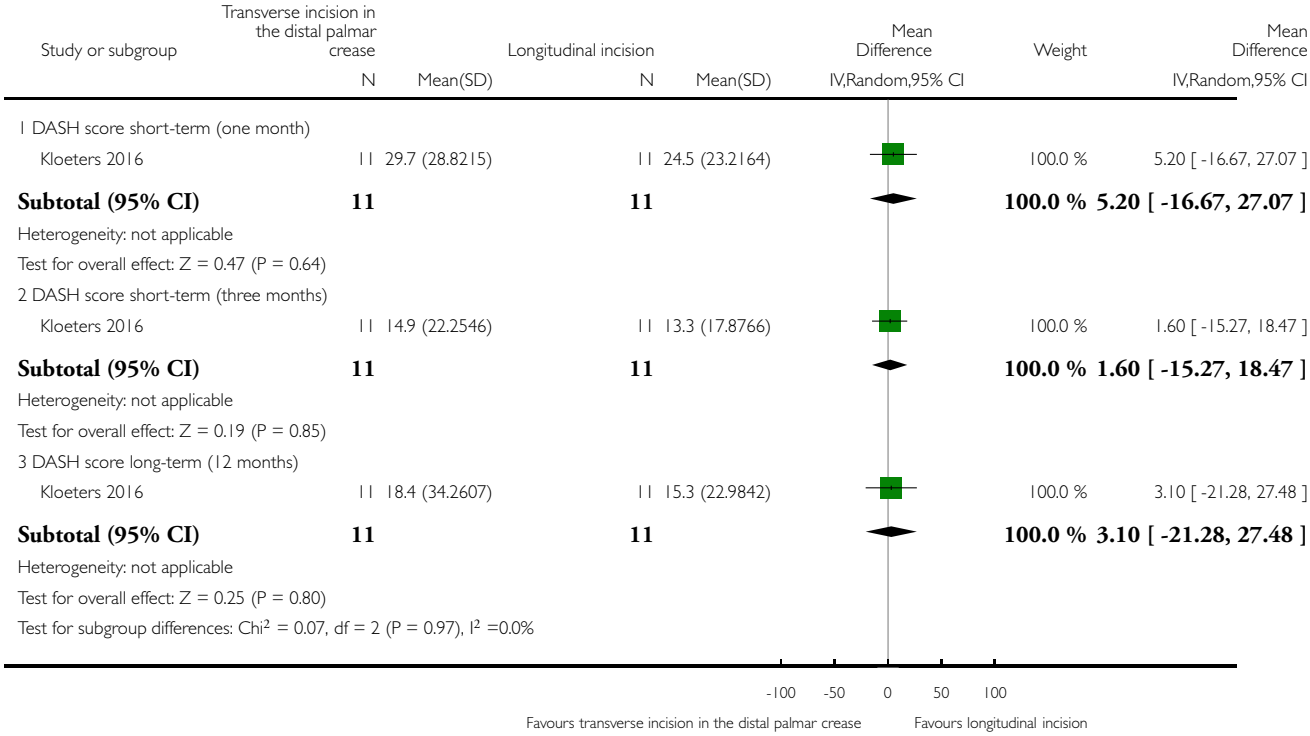


Analysis 8.1. Comparison 8 Open surgery by transverse incision of the skin in the distal palmar crease versus open surgery by longitudinal incision of the skin, Outcome 1 DASH score.

Review: Surgery for trigger finger

Comparison: 8 Open surgery by transverse incision of the skin in the distal palmar crease versus open surgery by longitudinal incision of the skin

Outcome: 1 DASH score

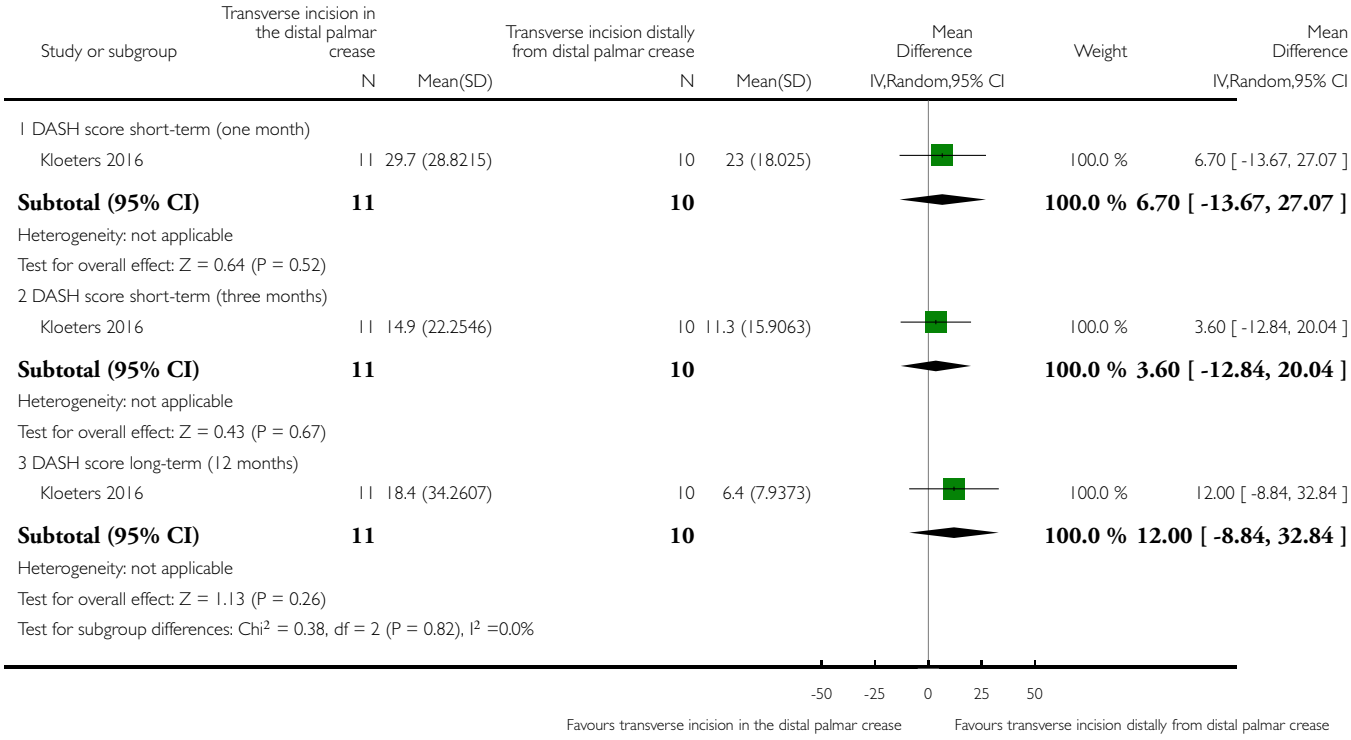


Analysis 9.1. Comparison 9 Open surgery by transverse incision of the skin in the distal palmar crease versus open surgery by transverse incision of the skin about 2-3 mm distally from distal palmar crease, Outcome 1 DASH score.

Review: Surgery for trigger finger

Comparison: 9 Open surgery by transverse incision of the skin in the distal palmar crease versus open surgery by transverse incision of the skin about 2– 3 mm distally from distal palmar crease

Outcome: 1 DASH score



APPENDICES

Appendix 1. CENTRAL via the Cochrane Library

#1 MeSH descriptor: [Trigger Finger Disorder] explode all trees
#2 trigger finger
#3 trigger thumb
#4 trigger digit
#5 snap* near finger
#6 snap* near thumb
#7 snap* near digit
#8 lock* near finger
#9 lock* near thumb
#10 lock* near digit
#11 #1 or #2 or #3 or #4 or #5 or #6 or #7 or #8 or #9 or #10

Appendix 2. MEDLINE (1946 to August 2, 2017)

1 Trigger Finger Disorder/ (401)
2 (trigger adj (finger$ or thumb$ or digit$)).tw. (812)
3 (snapping adj (finger$ or thumb$ or digit$)).tw. (38)
4 (locking adj (finger$ or thumb$ or digit$)).tw. (7)
5 or/1-4 (925)
6 Orthopedics/ (19436)
7 exp Orthopedic Procedures/ (258870)
8 su.fs. (1821619)
9 (surger$ or surgical$ or operat$).tw. (2163875)
10 or/6-9 (3136300)
11 5 and 10 (571)
12 randomized controlled trial.pt. (470060)
13 controlled clinical trial.pt. (94456)
14 randomized.ab. (403594)
15 placebo.ab. (189089)
16 drug therapy.fs. (2021488)
17 randomly.ab. (280473)
18 trial.ab. (423411)
19 groups.ab. (1725392)
20 or/12-19 (4122380)
21 (animals not (humans and animals)).sh. (4409922)
22 20 not 21 (3559665)
23 11 and 22 (100)

Appendix 3. Embase (1947 to February 14, 2013)

1 Trigger Finger Disorder/ (429)
2 (trigger adj (finger$ or thumb$ or digit$)).tw. (1203)
3 (snapping adj (finger$ or thumb$ or digit$)).tw. (78)
4 (locking adj (finger$ or thumb$ or digit$)).tw. (15)
5 or/1-4 (1389)
6 Orthopedics/ (33367)
7 exp Orthopedic Procedures/ (553613)
8 su.fs. (3137208)
9 (surger$ or surgical$ or operat$).tw. (3905446)
10 or/6-9 (5717763)
11 5 and 10 (872)
12 randomized controlled trial.pt. (340614)
13 controlled clinical trial.pt. (85208)
14 randomized.ab. (599068)
15 placebo.ab. (327198)
16 drug therapy.fs. (1578084)
17 randomly.ab. (427551)
18 trial.ab. (626990)
19 groups.ab. (2866231)
20 or/12-19 (5271971)
21 (animals not (humans and animals)).sh. (3671560)
22 20 not 21 (4829703)
23 11 and 22 (111)

Appendix 4. Embase (February 14, 2013 to August 02, 2017)

1 Trigger Finger Disorder/ (303)
2 (trigger adj (finger$ or thumb$ or digit$)).tw. (907)
3 (snapping adj (finger$ or thumb$ or digit$)).tw. (57)
4 (locking adj (finger$ or thumb$ or digit$)).tw. (11)
5 or/1-4 (1042)
6 Orthopedics/ (21203)
7 exp Orthopedic Procedures/ (427572)
8 su.fs. (1928203)
9 (surger$ or surgical$ or operat$).tw. (3007712)
10 or/6-9 (4139807)
11 5 and 10 (653)
12 random$.tw. (1235025)
13 factorial$.tw. (31365)
14 crossover$.tw. (63828)
15 cross over.tw. (28105)
16 cross-over.tw. (28105)
17 placebo$.tw. (263813)
18 (doubl$ adj blind$).tw. (184847)
19 (singl$ adj blind$).tw. (19969)
20 assign$.tw. (323523)
21 allocat$.tw. (120056)
22 volunteer$.tw. (228710)
23 crossover procedure/ (53097)
24 double blind procedure/ (143773)
25 randomized controlled trial/ (465603)

26 single blind procedure/ (28838)
27 or/12-26 (1926861)
28 11 and 27 (53)
29 limit 28 to dd=20130214-20170802 (9)

Appendix 5. LILACS

Keyword: trigger finger

Appendix 6. ClinicalTrials.gov

Keyword: trigger finger

Appendix 7. WHO International Clinical Trials Registry Platform

Keyword: trigger finger

WHAT'S NEW

Last assessed as up-to-date: 1 August 2017.

Date	Event	Description
27 March 2012	Amended	CMSG ID A054-P

CONTRIBUTIONS OF AUTHORS

All authors contributed to the review. HFJ, MJT, ML and JCB drafted the review. MJT, ML and JCB provided input on methodological issues. HFJ, MJT, ML and JCB designed the search strategy with editorial feedback. They also undertook searches and extracted data from papers. HFJ, MJT, ML and JCB carried out and interpreted the analysis. HFJ, MJT, ML, JBGS, FF and JCB drafted the final review. The guarantor of this review is HFJ.

DECLARATIONS OF INTEREST

A potential conflict of interest in this review arises because the authors JBGS, FF and JCB were co-authors in one of the 14 studies included in the review (Sato 2012).

SOURCES OF SUPPORT

Internal sources

- Universidade Federal de São Paulo, Brazil.

External sources

- No sources of support supplied

DIFFERENCES BETWEEN PROTOCOL AND REVIEW

There was a change of authors. The main author (FCV) of the protocol (see Ventin 2014) did not participate in the review; and HFJ, who did not participate in authorship of the protocol, was main author of the review.

Although we had planned the inclusion of studies with at least three months of follow-up in our protocol (Ventin 2014), we included one study with follow-up of eight weeks because we believe that this study contributed relevant data to this review (Bamroongshawgasame 2010).

INDEX TERMS

Medical Subject Headings (MeSH)

Hyaluronic Acid [administration & dosage]; Injections, Intra-Articular [adverse effects]; Pain, Postoperative [etiology]; Recurrence; Steroids [administration & dosage]; Treatment Outcome; Trigger Finger Disorder [drug therapy; *surgery]

MeSH check words

Adult; Aged; Aged, 80 and over; Female; Humans; Male; Middle Aged